

## HRS DOCUMENTATION RECORD COVER SHEET

**Name of Site:** Michner Plating – Mechanic Street

**EPA ID No.** MIN000505842

### Contact Persons

**Site Investigation:**

Joseph Walczak  
Michigan Department of Environment, Great Lakes, and Energy  
Remediation and Redevelopment Division  
Superfund Section  
Site Assessment and Site Management Unit  
P.O. Box 30426  
Lansing, Michigan 48909

**Documentation Record:**

Nuria Muñiz  
NPL Coordinator  
Superfund Division SR-6J  
U.S. EPA, Region 5  
77 W. Jackson Blvd.  
Chicago, IL 60604  
(312) 886-4439

Kenyon A. Larsen  
Remedial Project Manager  
Tribal Lands Cleanup Section  
U.S. EPA, Region 9  
75 Hawthorne Street  
San Francisco, CA 94105  
(415) 914-4213

Ingrid Y. Chen  
Tetra Tech, Inc.  
1 S Wacker Dr. #3700  
Chicago, IL 60606

### Pathways, Components, or Threats Not Scored

The soil exposure and subsurface intrusion and air migration pathways were not scored in this Hazard Ranking System (HRS) documentation record because the ground water migration pathway achieves an HRS site score sufficient for inclusion on the National Priorities List (NPL). The surface water migration pathway was also not scored because it does not significantly contribute to the overall site score. Based on the proximity of the facility to potential targets for the soil exposure and subsurface intrusion and air migration pathways and past and ongoing discharges to the surface water migration pathway, these pathways may be of future concern to the U.S. Environmental Protection Agency (EPA).

## HRS DOCUMENTATION RECORD

Name of Site: Michner Plating - Mechanic Street

Date Prepared: September 2021

EPA Region: 5

Street Address of Site\*: 520 North Mechanic Street

City, County, State, Zip Code: Jackson, Jackson County, Michigan, 49201

General Location in the State: Southcentral portion of Michigan

Topographic Map: Jackson North, MI, 7.5' Topographic Quadrangle, 2019

Latitude: 42° 15' 12.6396" North or 42.253511

Longitude: 84° 24' 25.236" West or -84.407010

Refs: 3; 4; 5, p. 7

- \* The street address, coordinates, and contaminant locations presented in this HRS documentation record identify the general area the Michner Plating - Mechanic Street site (Michner Plating) is located. They represent one or more locations EPA considers to be part of the site based on the screening information EPA used to evaluate the site for NPL listing. EPA lists national priorities among the known "releases or threatened releases" of hazardous substances; thus, the focus is on the release and not on precisely delineated boundaries. A site is defined as where a hazardous substance has been "deposited, stored, disposed, or placed, or has otherwise come to be located." Generally, HRS scoring and the subsequent listing of a release merely represent the initial determination that a certain area may need to be addressed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Accordingly, EPA contemplates that the preliminary description of facility boundaries at the time of scoring will be refined as more information is developed as to where contamination has come to be located.

### Scores

Air Pathway	NS
Ground Water Pathway <sup>1</sup>	78.24
Soil Exposure and Subsurface Intrusion Pathway	NS
Surface Water Pathway	NS
<b>HRS SITE SCORE</b>	<b>39.12</b>

---

<sup>1</sup> "Ground water" and "groundwater" are synonymous; the spelling is different due to "ground water" being codified as part of the HRS, while "groundwater" is the modern spelling.

**WORKSHEET FOR COMPUTING HRS SITE SCORE**

	<u>S</u>	<u>S<sup>2</sup></u>
1. Ground Water Migration Pathway Score ( $S_{gw}$ ) (from Table 3-1, line 13)	78.24	6,121.49
2a. Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	NS	NS
2b. Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	NS	NS
2c. Surface Water Migration Pathway Score ( $S_{sw}$ ) Enter the larger of lines 2a and 2b as the pathway score.	NS	NS
3a. Soil Exposure Component Score ( $S_{se}$ ) (from Table 5-1, line 22)	NS	NS
3b. Subsurface Intrusion Component Score ( $S_{ssi}$ ) (from Table 5-11, line 12)	NS	NS
3c. Soil Exposure and Subsurface Intrusion Pathway Score ( $S_{sessi}$ ) (from Table 5-11, line 13)	NS	NS
4. Air Migration Pathway Score ( $S_a$ ) (from Table 6-1, line 12)	NS	NS
5. Total of $S_{gw}^2 + S_{sw}^2 + S_{sessi}^2 + S_a^2$		<u>6,121.49</u>
6. <b>HRS Site Score</b> Divide the value on line 5 by 4 and take the square root	39.12	

**HRS Table 3-1 –Ground Water Migration Pathway Scoresheet**

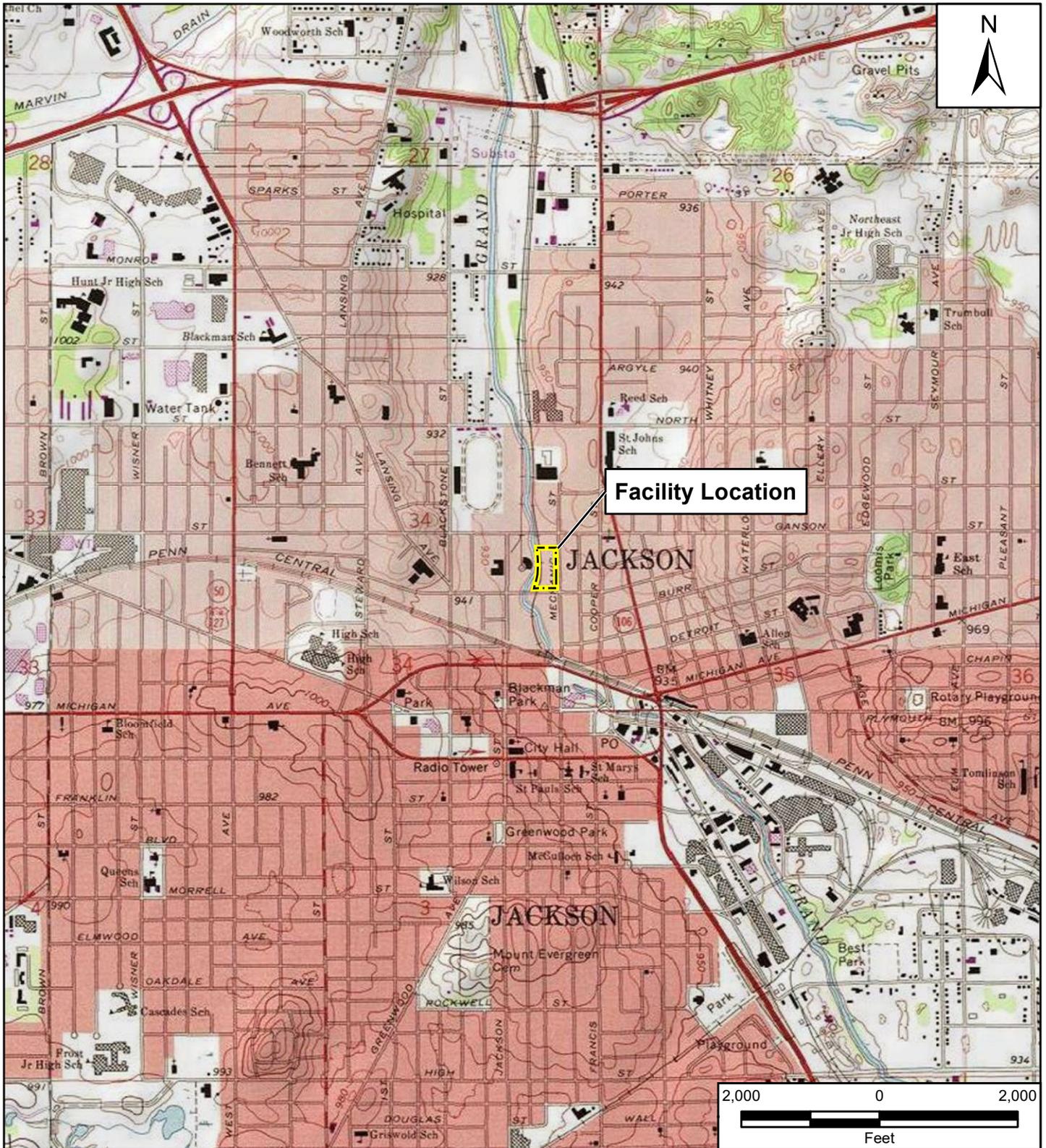
Factor Categories and Factors	Maximum Value	Value Assigned
<b>Likelihood of Release to an Aquifer:</b>		
1. Observed Release	550	550
2. Potential to Release:		
2a. Containment	10	NS
2b. Net Precipitation	10	NS
2c. Depth to Aquifer	5	NS
2d. Travel Time	35	NS
2e. Potential to Release [(lines 2a x (2b + 2c + 2d)]	500	NS
3. Likelihood of Release (higher of lines 1 and 2e)	550	550
<b>Waste Characteristics:</b>		
4. Toxicity/Mobility	(a)	10,000
5. Hazardous Waste Quantity	(a)	10
6. Waste Characteristics	100	18
<b>Targets:</b>		
7. Nearest Well	50	5
8. Population:		
8a. Level I Concentrations	(b)	0
8b. Level II Concentrations	(b)	0
8c. Potential Contamination	(b)	637
8d. Population (lines 8a + 8b + 8c)	(b)	637
9. Resources	5	5
10. Wellhead Protection Area	20	5
11. Targets (lines 7 + 8d + 9 + 10)	(b)	652
<b>Ground Water Migration Score For An Aquifer:</b>		
12. Aquifer Score [(lines 3 x 6 x 11)/82,500] <sup>c</sup>	100	78.24
<b>Ground Water Migration Pathway Score:</b>		
13. Pathway Score ( $S_{gw}$ ), (highest value from line 12 for all aquifers evaluated) <sup>c</sup>	100	78.24

<sup>a</sup> Maximum value applies to waste characteristics category.

<sup>b</sup> Maximum value not applicable.

<sup>c</sup> Do not round to nearest integer.

NS Not scored



**Legend**  
 Approximate Facility Boundary

Michner Plating - Mechanic Street  
 520 N Mechanic Street  
 Jackson, Jackson County, Michigan

**Figure 1**  
**Facility Location Map**



Source: Ref. 3, p. 2, - USGS 7.5-Minute Topographic Quadrangle Map:  
 Jackson, MI North 1970  
 Ref. 6, p. 36

Prepared For: EPA

Prepared By: Tetra Tech, Inc.

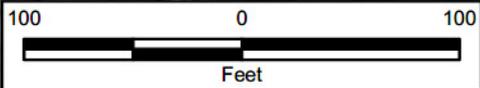
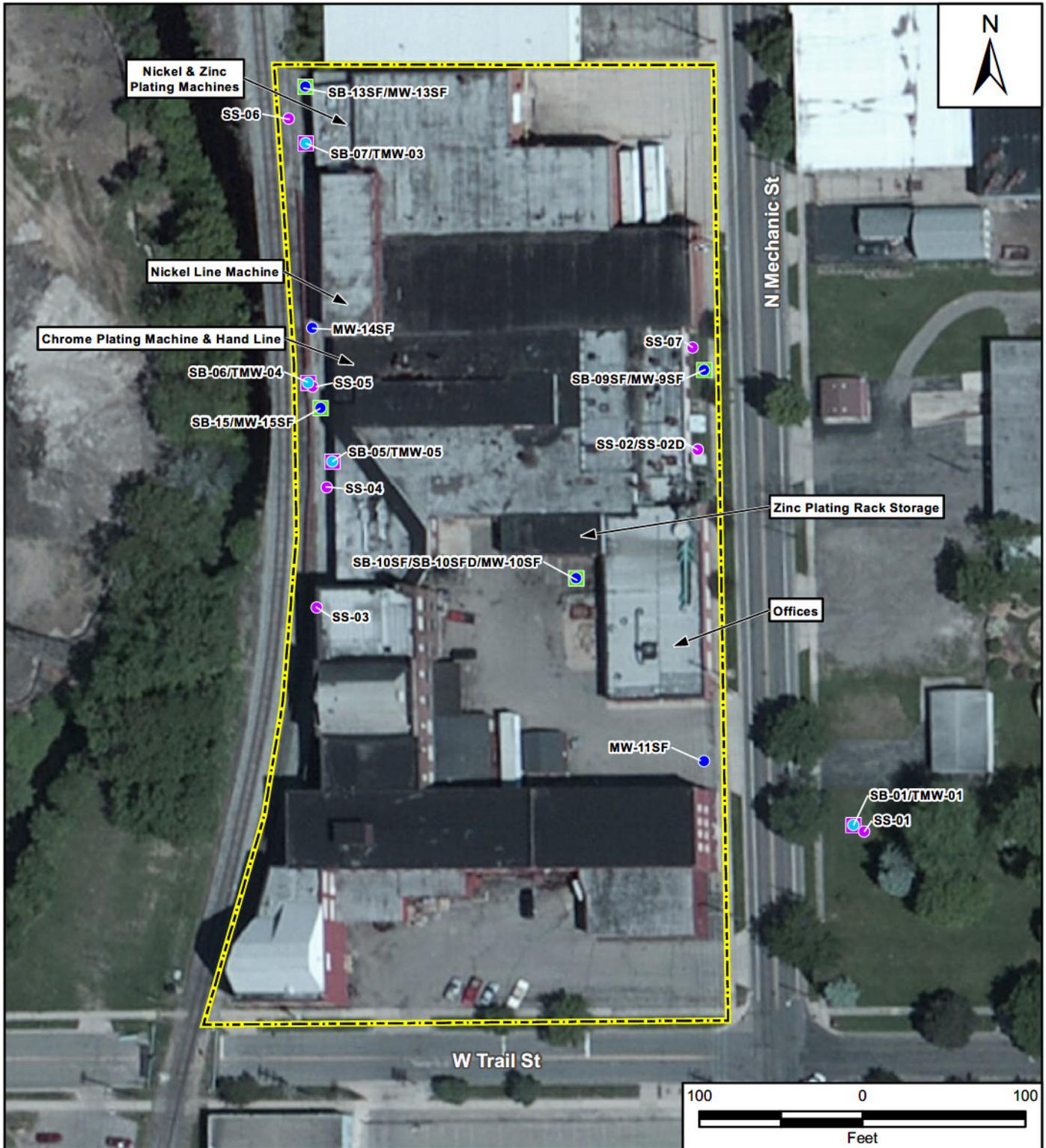


Image Source: ESRI World Imagery

- Surface Soil Sample (2018 Site Inspection – Ref. 5)
- Subsurface Soil Sample (2018 Site Inspection – Ref. 5)
- Subsurface Soil Sample (2019 Expanded Site Inspection – Ref. 6)
- Temporary Monitoring Well (2018 Site Inspection – Ref. 5)
- Permanent Monitoring Well (2019 Expanded Site Inspection – Ref. 6)
- Approximate Facility Boundary (2019 Expanded Site Inspection – Ref. 6)

Michner Plating - Mechanic Street  
520 N Mechanic Street  
Jackson, Jackson County, Michigan

**Figure 2**  
**Facility Features and**  
**Sample Locations**

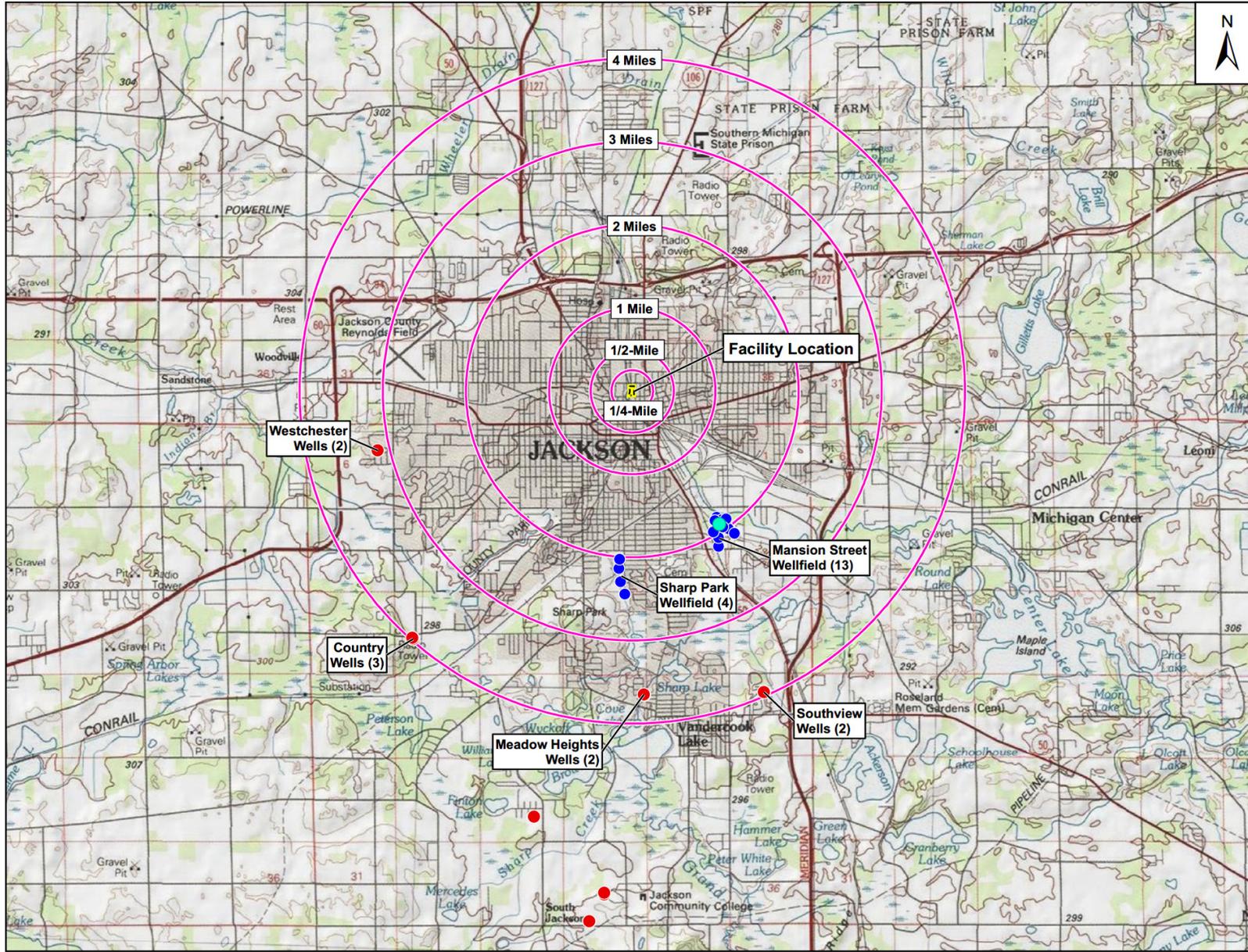


Prepared For: EPA

Prepared By: Tetra Tech, Inc.

The source of this map image is Esri, used by the EPA with Esri's permission

File Path: C:\GIS\0301-START\Michigan\Michner Plating Mechanisms\2025-06\Fig-WellLocations-4MileRings.mxd





**Legend**

- Summit Township Municipal Wells
- City of Jackson Municipal Wells
- Mansion Street Well #1 - 1.88 miles from Michner Plating
- Distance Rings
- Approximate Facility Boundary

**City of Jackson Wells by Distance Ring**

0 to 1/4 mile:	0
1/4 to 1/2 mile:	0
1/2 to 1 mile:	0
1 to 2 miles:	9
2 to 3 miles:	8
3 to 4 miles:	0
<b>Total wells:</b>	<b>17</b>

**Summit Township Municipal Wells by Distance Ring**

0 to 1/4 mile:	0
1/4 to 1/2 mile:	0
1/2 to 1 mile:	0
1 to 2 miles:	0
2 to 3 miles:	0
3 to 4 miles:	9
Beyond 4 Miles:	6
<b>Total wells:</b>	<b>15</b>

Numbers in parentheses after wellfield names and well names indicate the number of wells in that wellfield or at that well location

Note: Distance rings are measured outward from soil boring SB-10, which is one of the Source 1 soil sample locations and is in the central portion of the Michner facility

Sources:  
 Ref. 4, USGS 7.5-Minute Topographic Quadrangle Map: Jackson, MI South 2019.  
 Refs. 6, p. 36; 39, pp. 1-2; and 50, pp. 1-2



4,000 0 4,000  
Feet

Michner Plating - Mechanic Street  
 520 N Mechanic Street  
 Jackson, Jackson County, Michigan

**Figure 3**  
**4-Mile Radius Map**



Prepared For: EPA      Prepared By: Tetra Tech, Inc.

Coordinate System: NAD 1983 StatePlane Michigan South FIPS 2113 Feet  
 Projection: Lambert Conformal Conic  
 Datum: North American 1983

## REFERENCES

- | <u>Ref. No.</u> | <u>Description of the Reference</u>  |
|-----------------|--|
| 1.              | (EPA). Hazard Ranking System, Title 40 Code of Federal Regulations (CFR) Part 300, Appendix A (55 Federal Register [FR] 51583, Dec. 14, 1990, as amended at 82 FR 2779, Jan. 9, 2017; 83 FR 38037, Aug. 3, 2018), as published in the Code of Federal Regulations on July 1, 2019, with two attachments. Attachment A: Federal Register Vol. 55, No. 241. December 14, 1990. Hazard Ranking System Preamble. Attachment B: Federal Register Vol. 82, No. 5, January 9, 2017. Addition of a Subsurface Intrusion Component to the Hazard Ranking System Preamble. Available at <a href="https://semspub.epa.gov/src/document/HQ/100002489">https://semspub.epa.gov/src/document/HQ/100002489</a> . 197 pages. |
| 2.              | EPA. Superfund Chemical Data Matrix (SCDM). 2021. Online query of SCDM. Query accessed on January 28. 23 pages. <a href="https://www.epa.gov/superfund/superfund-chemical-data-matrix-scdm-query">https://www.epa.gov/superfund/superfund-chemical-data-matrix-scdm-query</a> .  |
| 3.              | U.S. Geological Survey (USGS). 1970 and 2019. 7.5' Topographic Quadrangle. Jackson North. 2 pages.   |
| 4.              | USGS. 2019. 7.5' Topographic Quadrangle. Jackson South. 1 page.  |
| 5.              | Michigan Department of Environmental Quality (MDEQ). 2018. Site Inspection Report for Michner Plating – Mechanic Street Site, 520 North Mechanic Street, Jackson, MI. July 30. 688 pages.  |
| 6.              | MDEQ. 2019. Expanded Site Inspection Report for Michner Plating – Mechanic Street, 520 North Mechanic Street, Jackson, MI. August 30. 540 pages.   |
| 7.              | EPA. 2018. Level 3 Data Validation for Michner Plating – Mechanic Street Site (MI). SDG ME0AA9, 10 Water Samples. Case # 47810. Metals, Mercury and Cyanide Analyses. Prepared for MDEQ. September 28. 67 pages.   |
| 8.              | EPA. 2018. Level 3 Data Validation for Michner Plating – Mechanic Street Site (MI). SDG ME0AA0, 5 Soil Samples. Case # 47810. Metals, Mercury and Cyanide Analyses. Prepared for MDEQ. September 28. 36 pages.   |
| 9.              | EPA. 2018. Electronic and Manual Data Validation for Region 5 Michner Plating – Mechanic Street Site (MI). SDG E0AA0, 5 Soils and 10 Water Samples. Case # 47810. 10 VOA, 15 SVOA, 15 Pest, 15 ARO Analyses. Prepared for MDEQ. October 26. 229 pages.   |
| 10.             | IBECA Technologies Corp. 2006. Qualification of DACROMET® for Use with ASTM A490 High-Strength Structural Bolts. December 13. 71 pages.  |
| 11.             | MDEQ. Environmental Laboratory. 2018. Mechanic Street/Michner Plating. Water Sample Analysis for hexavalent chromium for MW-10SF, MW-11SF, and MW-14SF. Work Order #1808329. August 24. 11 pages.  |
| 12.             | MDEQ. Environmental Laboratory. 2018. Mechanic Street/Michner Plating. Water Sample Analysis for hexavalent chromium for MW-13SF and MW-15SF. Work Order #1808337. August 27. 6 pages.   |

13. MDEQ. Environmental Laboratory. 2018. Mechanic Street/Michner Plating. Soil Sample Analysis for volatile organic compounds for SB-9SF, SB-10SF, SB-13SF and SB-15SF. Work Order #1808321. September 26. 38 pages.
14. TestAmerica Laboratories, Inc. 2018. Michner Plating – N. Mechanic Street. 6 Water Samples. Job# 320-42551-1. Perfluorinated Hydrocarbon Analysis. Prepared for MDEQ. September 21. 42 Pages.
15. EPA. 2016. Level 3 Data Validation for Michner Plating – Mechanic’s Street Site. SDG # ME7ED9, 11 Water Samples. Case # 46630. Metals, Mercury and Cyanide Analyses. Prepared for MDEQ. December 22. 62 Pages.
16. EPA. 2016. Level 3 Data Validation for Michner Plating – Mechanics Street Site (MI). SDG # ME7EB1, 19 Soil Samples. Case # 46630. Metals, Mercury and Cyanide Analyses. Prepared for MDEQ. December 12. 87 Pages.
17. EPA. 2016. Pollution Report (PolRep) #14: Michner Plating – Mechanic Street Site C57C, Jackson, MI. April 26. 8 pages.
18. Chen, Ingrid, Tetra Tech. 2020. Project Note: EPA CT Laboratories Results EPA Action Memo 475675. May 27. 42 pages.
19. Chen, Ingrid, Tetra Tech. 2020. Project Note: EPA Time Critical Removal Action Manifests from 2015 and 2016. May 15. 27 pages.
20. EPA. 2019. Final Close-Out Memorandum for Removal Action. Michner Plating – Mechanic Street Site, Jackson, Jackson County, Michigan. Site Spill Identification Number: C57C. May 16. 125 pages.
21. Chen, Ingrid, Tetra Tech. 2020. Project Note: Well Screen Interval Calculations. August 5. 1 page.
22. EPA. 1996. Using Qualified Data to Document an Observed Release and Observed Contamination. Quick Reference Fact Sheet. EPA 540-F-94-028. November. 18 pages.
23. EPA. 2016. Fact Sheet: PFOA & PFOS Drinking Water Health Advisories. EPA 800-F-16-003. November. 5 pages.
24. EPA. 2018. ESAT CLP Validation for Michner Plating – Mechanic Street Site (MI). SDG E0AA0, 5 Soil and 10 Water Samples. Case # 47810. Volatile, Semivolatile, Pesticide, Aroclor Analyses. Prepared for MDEQ. October 26. 230 pages.
25. MDEQ. Environmental Laboratory. 2016. Mechanic Street/Michner Plating. Soil Sample Analysis for Volatile Organic Compounds for Samples SS-01 through SS-07, SB-01, SB-05, SB-06, and SB-07. Work Order #1610188. December 5. 70 pages.
26. Michigan Department of Environmental Quality (MDEQ), Geological and Land Management Division. 2003. Excerpted from: Heinrich, E.W., 1976. The Mineralogy of Michigan, Bulletin 6. 2 pages.
27. Milstein, Randall L. (compiler). 1987. Bedrock Geology of Southern Michigan (map). Michigan Department of Natural Resources, Geological Survey Division. Scale= 1:500,000. 1 page.

28. Farrand, W. R., and D. L. Bell. 1982. Quaternary Geology of Southern Michigan (map). Michigan Department of Natural Resources, Geological Survey Division, Lansing, Michigan. Scale = 1:500,000. 1 page.
29. Larsen, Kenyon and Sean Spears, Tetra Tech. 2020. Project Note: Select Well Logs Near Michner Plating Site. September 28. 6 pages. <https://www.egle.state.mi.us/well-logs/default.aspx>.
30. Larsen, Kenyon and Sean Spears, Tetra Tech. 2020. Project Note: Geologic Description of Water Well and Pump Record for Well ID 38000001807. Mansion Street Well #1. October 2. 3 pages.
31. MDEQ. 2000. Geologic Survey Division and Michigan Basin Geological Society, Stratigraphic Nomenclature for Michigan. 1 page.
32. Apple, Beth A., and Howard W. Reeves. 2007. Summary of Hydrogeologic Conditions by County for the State of Michigan. U.S. Geological Survey Open-File Report 2007-1236. 87 pages.
33. Westjohn, D. B., and T. L. Weaver. 1998. Hydrogeologic Framework of the Michigan Basin Regional Aquifer System. [Reston, Va.]. U.S. Department of the Interior, U.S. Geological Survey. 55 pages.
34. Westjohn, D.B., and T. L. Weaver. 1996. Hydrogeologic Framework of Mississippian Rocks in the Central Lower Peninsula of Michigan. U.S. Geological Survey Water-Resources Investigations Report 94-4246. 50 pages.
35. Westjohn, D.B., and T. L. Weaver. 1996. Hydrogeologic Framework of Pennsylvanian and Late Mississippian Rocks in the Central Lower Peninsula of Michigan. U.S. Geological Survey Water-Resources Investigations Report 94-4107. 52 pages.
36. Westjohn, D.B., and T. L. Weaver. 1996. Configuration of Fresh water/Saline-Water Interface and Geologic Controls on Distribution of Freshwater in a Regional Aquifer System, Central Lower Peninsula of Michigan. U.S. Geological Survey Water-Resources Investigations Report 94-4242. 48 pages.
37. Larsen, Kenyon and Sean Spears, Tetra Tech. 2020. Project Note: Well Logs Showing Marshall Sandstone Aquifer. October 2. 15 pages.
38. Larsen, Kenyon and Sean Spears, Tetra Tech. 2020. Project Note: Well Logs Showing Glacial Drift Aquifer. State of Michigan Scanned Water Well Record Retrieval System (Accessed May 15, 2020). September 29. 32 pages. <https://www.egle.state.mi.us/well-logs/default.aspx>.
39. Larsen, Kenyon, Tetra Tech. 2020. Project Note: City of Jackson Drinking Water Supply System. March 30. 2 pages.
40. Chen, Ingrid, Tetra Tech. 2020. Project Note: City of Jackson Public Works Notice of Violation (NOV) NC 9 75 01 1582. April 30. 1 page.
41. MDEQ. 2018. Site Inspection Report for Michner Plating - Angling Road. EPA ID No. MIN000505848. November 27. 757 pages.

42. Williams & Works. 2008. City of Jackson, Michigan Wellhead Protection Program. June. 74 pages.
43. Wen, T., C. Castro, M.C. Hall, D. L. Pinti, and K. C. Lohmann. 2016. “Constraining Groundwater Flow in the Glacial Drift and Saginaw Aquifers in the Michigan Basin through Helium Concentrations and Isotopic Ratios.” *Geofluids*, Vol. 16, 3-25. 23 pages.
44. EPA. 2017. TechLaw-ESAT CLP Validation for Michner Plating – Mechanic Street Site (MI). SDG E7ED8, 11 Water Samples. Case # 46630. Volatile, Semivolatile, Pesticide, Aroclor Analyses. Prepared for MDEQ. January 10. 152 pages.
45. EPA. 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water. EPA/600/R-98/128. September. 248 pages.
46. Larsen, Kenyon, Tetra Tech. 2020. Project Note: Google Maps Screen Shot Measuring Distance from Michner Site to Matthew Plating. May 14. 2 pages.
47. ALS Environmental. 2015. Michner Plating. 8 Waste Samples. Work Order # 15091575. Volatile, Semi-volatile, Metals, pH, Reactivity for Cyanides and Sulfides, Total Cyanide, Total Petroleum Hydrocarbon (TPH), Pesticide, Aroclor, Heat of Combustion, Percent Moisture Analyses. Prepared for LATA-Kemron Remediation Services, LLC. October 7. 257 pages.
48. U.S. Department of Commerce. 2020. U.S. Census Bureau QuickFacts: Summit Township, Jackson County, Michigan. Accessed May 15. 3 pages.  
<https://www.census.gov/quickfacts/summittownshipjacksoncountymichigan>.
49. Interstate Technology Regulatory Council (ITRC). 2020. History and Use of Per- and Polyfluoroalkyl Substances (PFAS). April. 8 pages.
50. Larsen, Kenyon, Tetra Tech. 2020. Project Note: Summit Township Drinking Water Supply System. April 14. 2 pages.

## SITE SUMMARY

Michner Plating - Mechanic Street (EPA ID#: MIN000505842) is located at 520 North Mechanic Street (Michner Plating) (see Figure 1). For HRS scoring in this documentation record, the Michner Plating site includes one source of contaminated soil documented along the public sidewalk on the eastern perimeter, in the courtyard, and along the west side of Michner Plating behind the buildings where uncontrolled hazardous substances are located. The Michner Plating site also includes an observed release by chemical analysis to the ground water migration pathway of arsenic, cadmium, chromium, copper, cyanide, nickel, zinc, 1,1-dichloroethylene (also referred to as 1,1-dichloroethene or 1,1-DCE), cis-1,2-dichloroethylene (also referred to as cis-1,2-dichloroethene or cis-1,2-DCE), trans-1,2-dichloroethylene (also referred to as trans-1,2-dichloroethene or trans-1,2-DCE), 1,1-dichloroethane (1,1-DCA), 1,1,1-trichloroethane (1,1,1-TCA), trichloroethylene (also referred to as trichloroethene or TCE), tetrachloroethylene (also referred to as perchloroethene or PCE), and vinyl chloride (see Section 3.1.1 of this HRS documentation record). Municipal wells from the City of Jackson and Summit Township located between 1 and 4 miles from the facility are subject to potential contamination within the target distance limit (see Figure 3 and Section 3.3 of this HRS documentation record).

**Site Sources Scored:** This HRS documentation record includes the scoring documentation for one source of contaminated soil along the public sidewalk on the eastern perimeter, in the courtyard, and along the west side of the facility (see Section 2.2.1 of this HRS documentation record).

**HRS Pathways Scored:** The ground water migration pathway is scored in this documentation record. The primary targets evaluated are the people served by drinking water wells within 4 miles of the site (see Section 3.3.2.4 of this HRS documentation record).

The surface water migration pathway was not scored because no targets are subject to actual contamination even though contaminants attributable to Michner Plating operations are detected in sediments above background concentrations (Ref. 16, pp. 82-85). Also, per- and polyfluoroalkyl substances (PFAS), such as perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS), have been detected in the groundwater beneath the Michner Plating facility (Ref. 14, pp. 6, 7, 8). The use of PFAS has been associated with surfactant, wetting agent/fume suppressants for chrome and nickel electroplating and post-plating cleaners (Ref. 49, p. 5). PFAS are not scored in this HRS documentation record.

## FACILITY HISTORY

The Michner Plating facility, located at 520 North Mechanic Street in the City of Jackson, Jackson County, Michigan, is situated in a mixed residential and commercial area (Ref. 5, p. 10). The facility consists of two adjacent parcels, totaling approximately 4 acres, and four abandoned buildings, covering approximately 137,000 square feet, which historically contained chrome, nickel, and zinc plating lines (Ref. 5, p. 10). The Michner Plating Company was a supplier for the automotive industry, performing machine fabricating, rack design, and machine maintenance (Ref. 20, p. 1). Processes included Dacromet coating, nickel chrome plating, zinc plating, and powder coating (Ref. 20, pp. 1, 2). DACROMET® coating is described in industrial literature as a proprietary coating system generally understood as overlapping zinc and aluminum flake in a chromium-oxide binder system (Ref. 10, p. 8). The facility is bounded to the north by a commercial property, to the east by North Mechanic Street with residential dwellings and commercial properties, to the south by East Trail Street with commercial properties beyond, and to the west by a railroad and the Grand River (Refs. 17, p. 2; 46, p. 2).

The former plating shop operated at the facility from 1938 to 2007 (Ref. 5, p. 8). Michner Plating Company filed for Chapter 11 bankruptcy in the U.S. Bankruptcy Court for the Eastern District of Michigan on January 29, 2007 (Ref. 20, p. 1). Portions of the property sewer lines were cemented off after 2004 because of past discharge

violations to the local sanitary sewer system (Ref. 5, p. 11). Floor drains, parking areas, and roof drains discharge directly or indirectly to groundwater and the Grand River (Ref. 5, p. 8).

On August 24, 1976, 3,000 pounds of chromic acid (800 pounds of hexavalent chromium) were released to the city sewer lines and caused the city's wastewater treatment plant to overflow into the Grand River (Ref. 5, pp. 15, 16). Chromium was detected at 32 parts per million (ppm) in sewage effluent and up to 13 milligrams per liter (mg/l) in the Grand River (Ref. 5, pp. 15, 16). The chromium concentration in the Grand River at Onondaga, over 20 miles downstream of the wastewater treatment plant, was 10 mg/l (Ref. 5, pp. 15, 16). This release resulted in the issuance of a Notice of Noncompliance (NC 9 75 01 1582) to Michner (Ref. 5, pp. 15, 16). The City of Jackson Public Works confirmed that it is the agency that issued the violation, and the documentation of this release is no longer available (Ref. 40, p. 1). No hexavalent chromium was detected in the groundwater in the 2018 ESI sampling (Refs. 6, p.23; 11, pp. 3, 4, 5; 12, pp. 3, 4).

Michner applied for a Resource Conservation and Recovery Act (RCRA) Part B Treatment Storage and Disposal Permit (TSD) in 1980 and was rejected because facility operations did not warrant a permit (Ref. 5, p. 15). Multiple RCRA Notice of Violations were issued from 1989 to 2007 when the facility ceased to operate (Ref. 5, p. 15). Michigan Department of Environmental Quality (MDEQ), now referred to as the Department of Environment, Great Lakes, and Energy (EGLE), issued National Pollutant Discharge Elimination System (NPDES) permits and provided associated certificates of coverage starting in 1989 (Ref. 5, p. 15). The City of Jackson issued 84 to 159 violations per year from 2000 to 2003 because of ongoing discharges, repeated spills, and repeated effluent violations at the Michner facility. Records indicate that Michner did not return to compliance during the reporting periods (Ref. 5, p. 16).

The EPA Emergency Response Branch (ERB) conducted a time-critical removal action at the Michner Plating facility from August 2015 to June 2016 (Ref. 5, p. 12). Approximately 1,100 drums, vats, totes, and other containers were observed at the Michner Plating facility in various degrees of deterioration, and labels and sample analytical results established the presence of cadmium, chromium, copper, cyanide, zinc cyanide, nickel chloride, chromic acids, hydrogen peroxide, sulfuric acids, ignitable wastes, reactive wastes (including water reactive chemicals), and other chemicals (Refs. 17, p. 2; 18, pp. 30, 31, 38, 39, 40, 41). Approximately 79,000 gallons of hazardous liquid waste; 170 cubic yards of hazardous solid waste, empty containers, and debris; and 106 tons of hazardous solid wastes were removed from the facility (Ref. 20, p. 2). Four drums of cadmium balls with concentrations up to 51,700 mg/kg were noted to be present and sampled for disposal (Refs. 17, p. 3; 18, p. 30). Approximately 10 tons of cadmium containing RCRA D007 hazardous waste was disposed of at the U.S. Ecology RCRA Part B facility in 2016 (Ref. 19, pp. 1, 22).

## 2.2 SOURCE CHARACTERIZATION

### 2.2.1 SOURCE IDENTIFICATION

Name of Source: Contaminated Soil

Number of Source: 1

Source Type: Contaminated Soil

Description and Location of Source (with reference to a map of the Michner Plating facility):

Source 1 consists of contaminated soil along the public sidewalk on the eastern perimeter, in the courtyard, and along the west side of the Michner Plating facility behind the buildings; and is established by seven surface soil samples (including one background sample) and four subsurface soil samples (including one background sample) collected during the 2016 Site Inspection (SI), and three additional subsurface soil samples collected during the 2018 Expanded Site Inspection (ESI) shown on Figure 2 of this documentation record (Refs. 5, pp. 20, 42, 43; 6, pp. 19, 37). All surface soil samples were collected using stainless steel trowels from 0 to 12 inches below the ground surface and all subsurface samples were collected using a direct push rig from 4 to 12 feet bgs for the SI, and from 5 to 15 feet bgs for the ESI (Refs. 5, pp. 20, 21; 6, p. 19). Analyses for inorganics, semi-volatile organic compounds (SVOC), pesticide, and polychlorinated biphenyls (PCB) were conducted by EPA's Contract Laboratory Program (CLP) laboratories; analyses for volatile organic compounds (VOCs) were conducted by the EGLE environmental laboratory using EPA method 5035/MDEQ method 8260 (Refs. 5, p. 24; 6, p. 22; 9, pp. 31-146).

Since some contaminants are naturally occurring or ubiquitous in urban environments, soil contamination was established based on comparison to background. Only concentrations in source samples that were elevated above background levels were used to establish the presence of hazardous substances in Source 1 (Ref. 1, Table 2-3). Soil contamination was not inferred between contaminated sampling points because past contaminant deposition processes are not fully known. Instead, each contaminated soil sample location represents a discrete point of soil contamination, and those contaminated surface and subsurface soil sample locations are aggregated as a single source for this documentation record. Source 1 soil samples were aggregated into a single source because these samples: (1) document the same source type; (2) affect similar target populations; (3) have the same containment features; (4) are in the same watershed; and (5) contain similar hazardous substances (Refs. 5, pp. 48, 49, 50, 58-66, 77-81; 6, pp. 41-47, 51, 60, 95; 17, pp. 2-5; see also Sections 2.2.2 and 2.2.3 and Figures 2 and 3 of this HRS documentation record).

Source 1 samples comprise mostly sand and gravel soil types. The surface soil sampling consisted of seven SI surface samples collected within the top 12 inches of soil. The subsurface soil sampling consisted of four SI soil borings from the 0- to 4-foot (SB-06, SB-07) or 4- to 8-foot core (SB-01, SB-05) and three ESI soil borings from the 5- to 10-foot core. To assure sample similarity between source and background samples, surface soil source samples were only compared to surface background sample (SS-01) and subsurface source soil samples were only compared to subsurface background sample (SB-01). The following presents soil type descriptions of contaminated soil samples constituting Source 1 (Refs. 5, pp. 48-53; 6, pp. 41-47):

- **SS-01:** Damp, black, medium to fine sand with trace gravel, some roots.
- **SS-02 and SS-02D:** Moist, black, fine sand, some fine gravel, few roots.
- **SS-03:** Moist, dark brown, fine to medium sand, lots of gravel (more gravel with depth).

- **SS-04:** Moist, black to brown, crushed concrete with little sand to gravel with some medium to coarse sand.
- **SS-05:** Very moist, light brown, coarse sand and gravel (gravelly sand).
- **SS-06:** Moist, dark brown, medium to coarse sand with lots of gravel, some roots.
- **SS-07:** Moist, black to brown, organics, fine to medium sand with gravel.
- **SB-01:** Very moist, brown to orange-brown, fine-to-medium sand with some clay and fine gravel.
- **SB-05:** Moist to wet, brown, grey to greyish-black, silty clay with some fine-to-medium sand and fine with some coarse gravel.
- **SB-06:** Wet to very moist, black to blackish-grey, fine sand and woody material.
- **SB-07:** Very moist to moist, silty medium to coarse sand with some clay and fine gravel.
- **SB-9SF:** Very moist, light to dark brown, sandy silt.
- **SB-10SF:** Dry to moist, black to brown, fine to coarse sand with some slag and sandy weathered sandstone and float stone, yellow brick, and debris.
- **SB-13SF:** Very moist, greenish-grey to red-brown, silty sand with medium to coarse gravel.

## 2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH THE SOURCE

### - Background Concentrations:

Surface soil sample SS-01 was collected from a former residential yard across Mechanic Street that appeared to be free of site-related contamination and designated as the surface background sample. Subsurface soil sample SB-01 was collected in the vicinity of SS-01 that appeared to be free of site-related contamination and designated as the subsurface background sample (Ref. 5, pp. 20, 48-53). See Figure 2 of this HRS documentation record for sample locations. All surface soil samples were collected using stainless steel trowels from 0 to 12 inches below the ground surface and all subsurface samples were collected using a direct push rig from 4 to 12 feet bgs for the SI, and from 5 to 15 feet bgs for the ESI (Refs. 5, pp. 20, 21; 6, p. 13).

The surface soil composition of SS-01 is described in the SI as damp, black, medium to fine sand with trace gravel, and some roots, which is similar to other surface soil samples of native material. The subsurface soil composition of SB-01 is described as very moist, brown to orange-brown, fine to medium sand with some clay and fine gravel, which is similar to other subsurface soil samples of native material (Refs. 5, pp. 48-53; 6, pp. 41-47).

All SI soil samples were analyzed for VOCs by the EGLE environmental laboratory using EPA method 5035/MDEQ method 8260. CLP laboratories were used for inorganic (including metal) analyses in accordance with EPA CLP Statement of Work ISM02.3 and for SVOCs, pesticide, and PCB analyses in accordance with EPA CLP Statement of Work SOM01.2 (Refs. 5, p. 24; 16, p. 2).

Metals analysis was performed using the inductively coupled plasma-atomic emission spectroscopy (ICP-AES) procedure; mercury analysis was performed using the cold vapor atomic absorption spectroscopy (CVAAS) procedure; and cyanide analysis was performed using the midi-distillation procedure (Refs. 8, p. 2; 16, p. 2). The MDEQ laboratory analyzed soil samples for VOCs using EPA method 5035/MDEQ method 8260 (Refs. 5, p. 24; 6, p. 22).

<b>SI Sample ID/Depths (bgs)</b>	<b>Laboratory Sample ID</b>	<b>Date</b>	<b>Hazardous Substance</b>	<b>Hazardous Substance Concentration</b>	<b>RL/ CRQL</b>	<b>References</b>
SS-01/ (6 to 7 inches)	SS-01	10/25/ 2016	<b>Volatiles</b>	<b>µg/kg</b>	<b>µg/kg</b>	5, pp. 48-53, 143-152; 25, pp. 69, 70
			1,1,1-trichloroethane	ND	72	25, pp. 3, 69
			cis-1,2-dichloroethylene	ND	72	25, pp. 3, 69
			Trichloroethylene	ND	72	25, pp. 4, 69
			o-Xylene	ND	72	25, pp. 4, 69

<b>Table 1</b>						
<b>SI Sample ID/Depths (bgs)</b>	<b>Laboratory Sample ID</b>	<b>Date</b>	<b>Hazardous Substance</b>	<b>Hazardous Substance Concentration</b>	<b>RL/ CRQL</b>	<b>References</b>
<b>SS-01/</b> (0.5 to 7 inches)	<b>ME7EB1</b>	<b>10/25/2016</b>	<b>Inorganics</b>	<b>mg/kg</b>	<b>mg/kg</b>	5, pp. 48-53, 143-152; 16, pp. 1-6, 86, 87
			Arsenic	8.7	1.1	16, pp. 10, 78
			Cadmium	U	0.53	16, pp. 10, 78
			Chromium	19.221 <sup>a</sup> (14.9 J)	1.1	16, pp. 10, 78
			Copper	17.1	2.6	16, pp. 10, 78
			Cyanide	U	0.53	16, pp. 9, 85
			Lead	66.0	1.1	16, pp. 10, 78
			Manganese	479 <sup>a</sup> (386 J)	1.6	16, pp. 10, 78
			Mercury	0.3	0.1	16, pp. 8, 85
			Nickel	14.6	4.2	16, pp. 10, 78
			Selenium	3.7U	3.7	16, pp. 10, 78
			Silver	1.1U	1.1	16, pp. 10, 78
			Vanadium	17.7	5.3	16, pp. 10, 78
Zinc	96.9	6.3	16, pp. 10, 78			
<b>SB-01/</b> (4 to 8 feet)	<b>SB-01</b>	<b>10/25/2016</b>	<b>Volatiles</b>	<b>µg/kg</b>	<b>µg/kg</b>	5, pp. 48-53, 143-152; 25, pp. 69, 70
			1,1,1-trichloroethane	68U	68	25. pp. 33, 70
			cis-1,2-Dichloroethylene	68U	68	25. pp. 33, 70
			Tetrachloroethylene	68U	68	25. pp. 33, 70
			Trichloroethylene	68U	68	25. pp. 33, 70
			o-xylene	68U	68	25. pp. 33, 70

<b>SI Sample ID/Depths (bgs)</b>	<b>Laboratory Sample ID</b>	<b>Date</b>	<b>Hazardous Substance</b>	<b>Hazardous Substance Concentration</b>	<b>RL/ CRQL</b>	<b>References</b>
<b>SB-01/</b> (4 to 8 feet)	<b>ME7EB9</b>	<b>10/25/2016</b>	<b>Inorganics</b>	<b>mg/kg</b>	<b>mg/kg</b>	5, pp. 48-53, 143-152; 16, pp. 1-6, 86, 87
			Cadmium	0.55U	0.55	16, pp. 40, 80
			Chromium	22.2 <sup>a</sup> (17.2J)	1.1	16, pp. 40, 80
			Copper	11.6	2.7	16, pp. 40, 81
			Cyanide	0.55U	0.55	16, pp. 39, 85
			Lead	15.1	1.1	16, pp. 40, 81
			Mercury	0.11U	0.11	16, pp. 41, 85
			Nickel	25.4	4.4	16, pp. 40, 81
			Selenium	3.8U	3.8	16, pp. 40, 81
			Zinc	82.4	6.6	16, pp. 40, 81

## Notes:

<sup>a</sup> The “J” qualified background concentration for chromium has unknown bias; therefore, the reported concentration has been adjusted according to EPA fact sheet “*Using Qualified Data to Document an Observed Release and Observed Contamination*” (Ref. 22, p. 8). The laboratory-reported concentration is shown in parenthesis.

µg/kg Microgram per kilogram

bgs Below ground surface

CRQL Contract required quantitation limit. The EPA Contract Lab Program (CLP) sample adjusted CRQL is equivalent to the CRQL as defined by the HRS, Section 1.1, Definitions. (Refs. 1, Section 1.1; 16, pp. 2, 7-74, 81, 85).

EPA U.S. Environmental Protection Agency

mg/kg Milligram per kilogram

ND Not detected

RL Reporting limit. The RL is equivalent to the method detection limit as defined by the HRS, Section 1.1, Definitions. (Refs. 1, Section 1.1; 25, pp. 2-47).

SI Site Inspection

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. The CRQL is shown in the adjacent column.

## - Source Samples:

Source hazardous substances were identified in surface soil samples SS-02, SS-03, SS-04, SS-05, SS-06, and SS-07 when the concentrations exceeded three times the background concentration detected in sample SS-01, or when the sample concentration was above the RL/CRQL and the background concentration was not detected (Refs. 1, Table 2-3; 5, pp. 58-66; 6, p. 51).

<b>Table 2</b>						
<b>SI Sample ID/Depths (bgs)</b>	<b>Laboratory Sample ID</b>	<b>Date</b>	<b>Hazardous Substance</b>	<b>Hazardous Substance Concentration</b>	<b>RL/CRQL</b>	<b>References</b>
<b>SS-02/ SS-02D<sup>b/</sup></b> (0 to 6 inches)	<b>ME7EB2/ ME7EB3</b>	<b>10/25/2016</b>	<b>Inorganics</b>	<b>mg/kg</b>	<b>mg/kg</b>	5, pp. 48-53, 143-152; 16, pp. 1-6, 86, 87
			Cadmium	13.5	0.52	16, pp. 12, 14, 79
			Chromium	732 <sup>a</sup> (944J)	1.0	16, pp. 12, 14, 79
			Copper	229	2.6	16, pp. 12, 14, 78
			Cyanide	8.9	0.59	16, pp. 12, 14, 85
			Lead	520	1.0	16, pp. 12, 14, 79
			Nickel	146	4.1	16, pp. 12, 14, 79
			Zinc	1,250	6.3	16, pp. 12, 14, 78
<b>SS-03/</b> (0.5 to 10 inches)	<b>ME7EB4</b>	<b>10/25/2016</b>	<b>Inorganics</b>	<b>mg/kg</b>	<b>mg/kg</b>	5, pp. 48-53, 143-152; 16, pp. 1-6, 86, 87
			Cadmium	0.86	0.47	16, pp. 17, 79
			Chromium	82.17 <sup>a</sup> (106J)	0.94	16, pp. 17, 79
			Cyanide	0.84	0.52	16, pp. 18, 85

<b>Table 2</b>						
<b>SI Sample ID/Depths (bgs)</b>	<b>Laboratory Sample ID</b>	<b>Date</b>	<b>Hazardous Substance</b>	<b>Hazardous Substance Concentration</b>	<b>RL/CRQL</b>	<b>References</b>
SS-04/ (3 to 12 inches)	ME7EB5	10/25/2016	<b>Inorganics</b>	<b>mg/kg</b>	<b>mg/kg</b>	5, pp. 48-53, 143-152; 16, pp. 1-6, 86, 87
			Cadmium	2.7	0.49	16, pp. 28, 79
			Chromium	2,109 <sup>a</sup> (2,720J)	4.9	16, pp. 28, 79
			Copper	144	2.5	16, pp. 28, 79
			Cyanide	8.9	0.51	16, pp. 29, 85
			Manganese	16,129 <sup>a</sup> (20,000J)	37.1	16, pp. 28, 79
			Nickel	108	4.0	16, pp. 28, 79
			Selenium	7.7	3.5	16, pp. 28, 79
			Silver	7.2	0.99	16, pp. 28, 79
			Vanadium	343	4.9	16, pp. 28, 79
			Zinc	2,270	5.9	16, pp. 28, 79
SS-05/ (0 to 8 inches)	ME7EB6	10/25/2016	<b>Inorganics</b>	<b>mg/kg</b>	<b>mg/kg</b>	5, pp. 48-53, 143-152; 16, pp. 1-6, 86, 87
			Arsenic	42.6	0.92	16, pp. 32, 79
			Chromium	446 <sup>a</sup> (575J)	0.92	16, pp. 32, 80
			Copper	53.7	2.3	16, pp. 32, 80
			Cyanide	13.6	0.49	16, pp. 30, 85

<b>Table 2</b>						
<b>SI Sample ID/Depths (bgs)</b>	<b>Laboratory Sample ID</b>	<b>Date</b>	<b>Hazardous Substance</b>	<b>Hazardous Substance Concentration</b>	<b>RL/CRQL</b>	<b>References</b>
			Manganese	2,685 <sup>a</sup> (3,330J)	6.9	16, pp. 32, 80
			Silver	1.0	0.92	16, pp. 32, 80
			Vanadium	67.8	4.6	16, pp. 32, 80
			Zinc	339	5.5	16, pp. 32, 80
<b>SS-06/</b> (0 to 6 inches)	<b>ME7EB7</b>	<b>10/25/2016</b>	<b>Inorganics</b>	<b>mg/kg</b>	<b>mg/kg</b>	5, pp. 48-53, 143-152; 16, pp. 1-6, 86, 87
			Cadmium	1.3	0.46	16, pp. 33, 80
<b>SS-07/</b> (0 to 9 inches)	<b>ME7EB8</b>	<b>10/25/2016</b>	<b>Inorganics</b>	<b>mg/kg</b>	<b>mg/kg</b>	5, pp. 48-53, 143-152; 16, pp. 1-6, 86, 87
			Cadmium	3.5	0.55	16, pp. 38, 80
			Chromium	156 <sup>a</sup> (201J)	1.1	16, pp. 38, 80
			Copper	58.5	2.7	16, pp. 38, 80
			Cyanide	7.1	0.50	16, pp. 37, 85
			Nickel	1,650	4.4	16, pp. 38, 80

## Notes:

<sup>a</sup> The “J” qualified background concentration has unknown bias; therefore, the reported concentration has been adjusted according to EPA fact sheet “*Using Qualified Data to Document an Observed Release and Observed Contamination*” (Ref. 22, p. 8). The laboratory-reported concentration is shown in parenthesis.

<sup>b</sup> The results presented for duplicate samples are the lower of the two samples.

µg/kg Microgram per kilogram

bgs Below ground surface

CRQL Contract required quantitation limit. The EPA Contract Lab Program (CLP) sample adjusted CRQL is equivalent to the CRQL as defined by the HRS, Section 1.1, Definitions. (Refs. 1, Section 1.1; 16, pp. 7-74, 78, 79, 80, 81, 85).

EPA U.S. Environmental Protection Agency

ESI Expanded Site Inspection

mg/kg Milligram per kilogram

RL Reporting limit. The RL is equivalent to the method detection limit as defined by the HRS, Section 1.1, Definitions. (Refs. 1, Section 1.1; 25, pp. 2-47).

SI Site Inspection

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. The CRQL is shown in the adjacent column.

Subsurface soil samples SB-05, SB-06, SB-07, SB-9SF, SB-10SF, and SB-13SF were found to be elevated above background when compared to background sample SB-01 (Refs. 1, Table 2-3; 5, pp. 58-66; 6, p. 51).

<b>SI Sample ID/Depths (bgs)</b>	<b>Laboratory Sample ID</b>	<b>Date</b>	<b>Hazardous Substance</b>	<b>Hazardous Substance Concentration</b>	<b>RL/CRQL</b>	<b>References</b>
<b>SB-05/</b> (4 to 8 feet)	<b>SB-05</b>	<b>10/25/2016</b>	<b>Volatiles</b>	<b>µg/kg</b>	<b>µg/kg</b>	5, pp. 48-53, 143-152; 25, pp. 3-47, 69-70
			1,1,1-trichloroethane	250	71	25, pp. 36, 70
			cis-1,2-dichloroethylene	730	71	25, pp. 36, 70
			Trichloroethylene	420	71	25, pp. 37, 70
<b>SB-05/</b> (4 to 8 feet)	<b>ME7EC4</b>	<b>10/25/2016</b>	<b>Inorganics</b>	<b>mg/kg</b>	<b>mg/kg</b>	5, pp. 48-53, 143-152; 16, pp. 1-6, 86, 87
			Cadmium	1.1	0.47	16, pp. 44, 81
			Copper	63.4	2.3	16, pp. 44, 81
			Cyanide	1.6	0.56	16, pp. 43, 85
			Lead	273	0.93	16, pp. 44, 81
			Mercury	0.53	0.11	16, pp. 42, 85
			Nickel	163	3.7	16, pp. 44, 81
Selenium	8.5	3.3	16, pp. 44, 81			
<b>SB-06/</b> (0 to 4 feet)	<b>SB-06</b>	<b>10/25/2016</b>	<b>Volatiles</b>	<b>µg/kg</b>	<b>µg/kg</b>	5, pp. 48-53, 143-152; 25, pp. 3-47, 69-70
			Trichloroethylene	330	80	25, pp.40, 70

<b>Table 3</b>						
<b>SI Sample ID/Depths (bgs)</b>	<b>Laboratory Sample ID</b>	<b>Date</b>	<b>Hazardous Substance</b>	<b>Hazardous Substance Concentration</b>	<b>RL/CRQL</b>	<b>References</b>
			o-Xylene	82	80	25, pp.40, 70
<b>SB-06/</b> (0 to 4 feet)	<b>ME7EC5</b>	<b>10/25/2016</b>	<b>Inorganics</b>	<b>mg/kg</b>	<b>mg/kg</b>	5, pp. 48-53, 143-152; 16, pp. 1-6, 86, 87
			Cadmium	21.3	0.5	16, pp. 46, 81
			Chromium	410 <sup>a</sup> (529J)	1	16, pp. 46, 81
			Copper	145	2.5	16, pp. 46, 81
			Cyanide	9.6	0.54	16, pp. 45, 85
			Lead	109	1	16, pp. 46, 81
			Mercury	0.48	0.11	16, pp. 47, 85
<b>SB-07/</b> (0 to 4 feet)	<b>ME7EC6</b>	<b>10/25/2016</b>	<b>Inorganics</b>	<b>mg/kg</b>	<b>mg/kg</b>	5, pp. 48-53, 143-152; 16, pp. 1-6, 86, 87
			Copper	62.3	2.3	16, pp. 48, 81
			Cyanide	5.1	0.57	16, pp. 49, 85
			Mercury	0.53	0.11	16, pp. 50, 85

<b>Table 4</b>						
<b>ESI Sample ID/Depths (bgs)</b>	<b>Laboratory Sample ID</b>	<b>Date</b>	<b>Hazardous Substance</b>	<b>Hazardous Substance Concentration</b>	<b>RL/CRQL</b>	<b>References</b>
<b>SB-9SF/</b> (5 to 10 feet)	<b>SB-9SF</b>	<b>8/22/2018</b>	<b>Volatiles</b>	<b>µg/kg</b>	<b>µg/kg</b>	6, pp. 40-47, 87-115; 13, pp. 3-23, 38; 24, pp. 1-14
			Tetrachloroethylene	74	70	13, pp. 10, 38
			Trichloroethylene	86	70	13, pp. 10, 38
<b>SB-9SF/</b> (5 to 10 feet)	<b>ME0AA0</b>	<b>8/22/2018</b>	<b>Inorganics</b>	<b>mg/kg</b>	<b>mg/kg</b>	6, pp. 40-47, 87-115; 8, pp. 1-32; 24, pp. 222-230
			Cyanide	5.5	0.62	8, pp. 7, 36

<b>Table 4</b>						
<b>ESI Sample ID/Depths (bgs)</b>	<b>Laboratory Sample ID</b>	<b>Date</b>	<b>Hazardous Substance</b>	<b>Hazardous Substance Concentration</b>	<b>RL/CRQL</b>	<b>References</b>
			Nickel	221	3.6	8, pp. 9, 34
<b>SB-10SF/ SB-10SFD/ (0 to 10 feet)</b>	<b>ME0AA2/ ME0AB4</b>	<b>8/23/ 2018</b>	<b>Inorganics</b>	<b>mg/kg</b>	<b>mg/kg</b>	6, pp. 40-47, 87-115; 8, pp. 1-32; 24, pp. 222-230
			Chromium	88.0	1.0	8, pp. 22, 35
			Copper	102	2.6	8, pp. 22, 35
			Cyanide	11.7	0.67	8, pp. 20, 36
			Lead	278	1.0	8, pp. 22, 35
			Mercury	0.53	0.14	8, pp. 21, 36
			Zinc	1,010	6.2	8, pp. 22, 35
<b>SB-13SF/ (5 to 10 feet)</b>	<b>ME0AB7</b>	<b>8/22/ 2018</b>	<b>Inorganics</b>	<b>mg/kg</b>	<b>mg/kg</b>	6, pp. 40-47, 87-115; 8, pp. 1-32; 24, pp. 222-230
			Chromium	84.1	0.86	8, pp. 28, 35

## Notes:

<sup>a</sup> The “J” qualified background concentration for chromium has unknown bias; therefore, the reported concentration has been adjusted according to EPA fact sheet “*Using Qualified Data to Document an Observed Release and Observed Contamination*” (Ref. 22, p. 8). The laboratory-reported concentration is shown in parenthesis.

µg/kg Microgram per kilogram

bgs Below ground surface

CRQL Contract required quantitation limit. The EPA Contract Lab Program (CLP) sample adjusted CRQL is equivalent to the CRQL as defined by the HRS, Section 1.1, Definitions. (Refs. 1, Section 1.1; 8, pp. 2, 34-36; 16, pp. 2, 7-74, 78-85).

EPA U.S. Environmental Protection Agency

ESI Expanded Site Inspection

mg/kg Milligram per kilogram

RL Reporting limit. The RL is equivalent to the method detection limit as defined by the HRS, Section 1.1, Definitions. (Refs. 1, Section 1.1; 13, pp. 2-23; 25, pp. 2-47).

SI Site Inspection

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. The CRQL is shown in the adjacent column.

List of Hazardous Substances Associated with Source

1,1,1-trichloroethane (TCA)	Mercury
Arsenic	Nickel
Cadmium	o-Xylene
Chromium	Selenium
cis-1,2-dichloroethylene (DCE)	Silver
Copper	Tetrachloroethylene (PCE)
Cyanide	Trichloroethylene (TCE)
Lead	Vanadium
Manganese	Zinc

## 2.2.3 HAZARDOUS SUBSTANCES AVAILABLE TO A PATHWAY

<b>Table 5</b>		
<b>Containment Description</b>	<b>Containment Factor Value</b>	<b>References</b>
Gas release to air:	NS	NA
Particulate release to air:	NS	NA
Release to groundwater:  The containment factor value for the ground water migration pathway was evaluated for “All Sources” for evidence of hazardous substance migration from the source area (i.e., the source area includes the source and any associated containment structures). The source is in situ contaminated soil with no containment features. No liner, engineered cover, functioning and maintained run-on control system and runoff management system were observed to be present during sample collection. An applicable containment factor value was determined based on existing analytical evidence of hazardous migration to groundwater. Therefore, the highest ground water migration pathway containment factor value of 10 was assigned to Source 1 as specified in Table 3-2 of the HRS (Ref. 1, Section 3.1.2.1).	10	See Section 3.1.1 of this HRS documentation record
Release via overland migration and/or flood:	NS	NA

## Notes:

NA Not applicable

NS Not scored

## 2.4.2 HAZARDOUS WASTE QUANTITY

### 2.4.2.1.1 Hazardous Constituent Quantity

#### Description

The hazardous constituent quantity for Source 1 could not be adequately determined according to the HRS requirements; that is, the total mass of all CERCLA hazardous substances in the source is not known and cannot be estimated with reasonable confidence (Ref. 1, Section 2.4.2.1.1). There are insufficient historical and current data (manifests, potentially responsible party records, state records, permits, and waste concentration data) available to adequately calculate the total mass of all CERCLA hazardous substances in the source and the associated releases from the source. Therefore, there is insufficient information to evaluate the associated releases from the source to calculate the hazardous constituent quantity for Source 1 with reasonable confidence (Ref. 1, Section 2.4.2.1.1). Scoring proceeds to the evaluation of Tier B, hazardous wastestream quantity (Ref. 1, Section 2.4.2.1.1).

Hazardous Constituent Quantity Assigned Value: Not Scored

### 2.4.2.1.2 Hazardous Wastestream Quantity

#### Description

The hazardous wastestream quantity for Source No. 1 could not be adequately determined according to the HRS requirements; that is, the total mass of all hazardous wastestreams and CERCLA pollutants and contaminants in the source is not known and cannot be estimated with reasonable confidence (Ref. 1, Section 2.4.2.1.2). There are insufficient historical and current data (manifests, potentially responsible party records, state records, and permits) available to adequately calculate the total mass of all hazardous wastestreams and CERCLA pollutants and contaminants in the source and the associated releases from the source. Therefore, there is insufficient information to evaluate the associated releases from the source to calculate the hazardous wastestream quantity for Source No. 1 with reasonable confidence. Scoring proceeds to the evaluation of Tier C, volume (Ref. 1, Section 2.4.2.1.2).

Hazardous Wastestream Quantity Assigned Value: Not Scored

### 2.4.2.1.3 Volume

#### Description

The depth of the contaminated soil is not known and is not likely to be uniform, and the areal extent cannot be determined because contamination cannot be consistently inferred between sampling points. The information available is not sufficient to evaluate Tier C source hazardous volume quantity for Source No. 1 with reasonable confidence. Therefore, hazardous volume quantity for Source 1 could not be adequately determined according to the HRS requirements (Ref. 1, Section 2.4.2.1.3). As a result, the evaluation of hazardous waste quantity scoring proceeds to the evaluation of Tier D (Ref. 1, Section 2.4.2.1.3).

Volume Assigned Value: 0

**2.4.2.1.4 Area**

Description

This contaminated soil source is made up of discrete sample locations with similar hazardous substances associated with facility processes (Refs. 5, Figures 4, 5; 6, Figure 3). See Section 2.2.2 of Source 1 for hazardous substances source samples. The total area of contaminated soil is unknown but greater than zero.

<b>Table 6</b>		
<b>Source Type</b>	<b>Units (ft<sup>2</sup>)</b>	<b>References</b>
Contaminated Soil	>0	5, Figures 4, 5; 6, Figure 3

Sum (square feet [ft<sup>2</sup>]): >0

Equation for Assigning Value (Ref. 1, Table 2-5):  $>0/34,000 = \text{unknown but greater than zero}$

Area Assigned Value: Unknown but greater than zero (>0)

**2.4.2.1.5 Source Hazardous Waste Quantity Value**

Highest Assigned Value Assigned from Ref. 1, Table 2-5: Unknown but greater than zero (>0)

## SUMMARY OF SOURCE DESCRIPTIONS

Table 7							
Source No.	Source Hazardous Waste Quantity Value	Source Hazardous Constituent Quantity Complete? (Y/N)	Containment Factor Value by Pathway				
			Ground Water (GW) (Ref. 1, Table 3-2)	Surface Water (SW)		Air	
				Overland/flood (Ref. 1, Table 4-2)	GW to SW (Ref. 1, Table 3-2)	Gas (Ref. 1, Table 6-3)	Particulate (Ref. 1, Table 6-9)
1	>0	No	10	NS	NS	NS	NS

Note:

NS Not scored

### Description of Other Possible Sources:

- Discharge to the Grand River – On August 24, 1976, 3,000 pounds of chromic acid (800 pounds of hexavalent chromium) were released to the city sewer lines and caused the city’s wastewater treatment plant to overflow into the Grand River. Chromium was detected at 32 ppm in sewage effluent and up to 13 mg/l in the Grand River. The chromium concentration in the Grand River at Onondaga, over 20 miles downstream of the wastewater treatment plant, was 10 mg/l. This release resulted in the issuance of a Notice of Noncompliance (NC 9 75 01 1582) to Michner (Ref. 5, pp. 15, 16).
- Buried Drums – The area behind the buildings was noted to exhibit strong solvent odors and staining. The ground penetrating radar (GPR) and electromagnetic (EM) surveys conducted during the SI geophysical survey identified three likely drum burial locations on the west side of the Michner Plating facility behind the buildings (Ref. 5, pp. 6, 18). In addition, a former employee reported that a truck load of drums filled with hazardous waste had been buried in a concrete pit and then capped with a concrete pad (Ref. 5, p. 13). Wastes at the Michner Plating facility are found to contain cadmium, chromium, copper, cyanide, zinc cyanide, nickel chloride, chromic acids, hydrogen peroxide, sulfuric acids, ignitable wastes, reactive wastes (including water reactive chemicals), and other chemicals (Refs. 17, p. 2; 18, pp. 1, 4, 5, 30, 31, 38, 39, 40, 41).
- Buried Indoor Tank – A former employee informed EPA of a buried tank filled with hazardous waste located under the original Michner plating portion of the building. The tank’s original use was possibly to store diesel fuel prior to being filled with hazardous waste and being abandoned. The tank is allegedly buried beneath a layer of dirt and a concrete slab with a second layer of dirt and sealed over to look like a plugged sanitary sewer (Ref. 5, p. 14). Wastes found at the Michner Plating facility are found to contain cyanide, zinc cyanide, nickel chloride, chromic acid, hydrogen peroxide, sulfuric acid, etc. (Refs. 17, p. 2; 18, pp. 3, 4, 5, 30, 31, 38, 39, 40, 41; 20, p. 2).

## 3.0 GROUND WATER MIGRATION PATHWAY

### 3.0.1 GENERAL CONSIDERATIONS

#### **Ground Water Migration Pathway Description**

This section on the ground water migration pathway for the Michner facility evaluates the Marshall aquifer, the primary drinking water aquifer, and all overlying, interconnected aquifers. Many of the geologic formations and aquifers described below exist throughout the Michigan basin, and the references cited describe these formations in general terms. Content from these references is used selectively to evaluate the Jackson County regional geology and the geology as it is known beneath the site.

#### **Regional Geology:**

Regionally, the geology is comprised of Glacial Drift, a Quaternary period unconsolidated layer of alluvium, underlain by a sequence of bedrock formations of the Pennsylvanian and Mississippian periods (Refs. 26; 31). In Jackson County, the Pennsylvanian period bedrock formations include the Saginaw Formation, the Parma Sandstone, and upper portions of the Bayport Limestone, while the Mississippian period bedrock formations include the lower Bayport Limestone, Michigan Formation, Michigan confining unit, Marshall Sandstone, and Coldwater Shale (Refs. 31; 32, pp. 42, 43). Each of these regional geologic layers is described below.

**Glacial Drift – Outwash Sand and Gravel and Postglacial Alluvium (Quaternary Period):** The surface and near surface geology in the area of the Michner Plating facility consists of Quaternary period glacial outwash sand and gravel and postglacial alluvium (Ref. 26, p. 2). The complete Quaternary period included four major glacial periods, but only the youngest (Wisconsinan) deposits are present in Michigan (Ref. 26, p. 2). The outwash and alluvium consist of fine to coarse sand alternating with layers of small gravel to heavy cobbles (Ref. 26, p. 2). These deposits consist of unconsolidated, non-stratified clastic sediments deposited directly from continental glaciers (drift) and unconsolidated stratified gravels, sands, and clays deposited by streams and glacial lakes between glacial periods (Ref. 26, p. 2). Near the Michner Plating facility, these deposits range in thickness from 0 to 100 feet bgs (Ref. 29, pp. 2-5). Based on well and boring logs on the Michner Plating facility, the depth of the unconsolidated outwash and alluvium overlying bedrock is 12 feet (Refs. 6, p. 96; 27; 29, pp. 1-5). A review of onsite and nearby well logs indicates that the unconsolidated, non-stratified clastic sediments overlying bedrock contain clay, sand, gravel, stone, and silt (Ref. 29). No clays or other restrictive layers in the unconsolidated, non-stratified clastic sediments are continuous within 2 miles of the Michner Plating site (Refs. 6, pp. 41-47; 29, pp. 1-4; 30, pp. 1-2).

**Saginaw Formation (Pennsylvanian Period):** The Saginaw Formation contains interbeds of discontinuous sandstone, siltstone, limestone, coal, and shale (Ref. 32, pp. 35, 36). The Saginaw Formation subcrops near the city of Jackson and thickens to the north (Refs. 33, p. 28; 35, pp. 10, 11, 12; 43, p. 4). The sandstone in the upper portions of the Saginaw Formation is the Saginaw aquifer (Ref. 32, p. 35). The Saginaw confining unit underlies the Saginaw Formation but is locally absent (Refs. 29, p. 2; 35, pp. 11, 15; 42, pp. 18, 19; 43, p. 4). The Saginaw confining unit was not observed in well logs within 2 miles of the site and its characteristic limestone and saline/brine water qualities are also absent (Refs. 29, p. 2; 35, pp. 19, 20).

**Parma-Bayport Formation (Pennsylvanian and Mississippian Periods):** The Parma Sandstone and the Bayport Limestone appear to interfinger throughout the Michigan Basin (Refs. 32, p. 36; 35, p. 9). These units are hydraulically connected, and, together, they form the Parma-Bayport Formation (Refs. 32, p. 36; 35, p. 9). In Jackson County, the water from the Parma-Bayport Formation may be saline (Ref. 32, p. 36). The Parma Sandstone is described in only one of four well logs within 0.25 mile of the Michner Plating facility (Ref. 29).

Michigan Formation (Mississippian Period): The Michigan Formation underlies the Parma-Bayport formation and consists of layers of sandstone, siltstone, anhydrite or gypsum, dolomite, limestone, and shale (Refs. 33, p. 20; 34, p. 13). The lower permeability lithologies of the Michigan Formation are considered a confining unit that separates the Parma-Bayport Formation from the underlying Marshall aquifer (Refs. 33, p. 20; 34, p. 13). The thickness of the Michigan Formation confining unit ranges from less than 50 to 400 feet within the state of Michigan but thins out to the south and is only present in the northern part of Jackson County (Refs. 33, p. 20; 34, pp. 13-15; 42, pp. 18, 19).

Marshall Sandstone Formation (Mississippian Period): The Marshall Sandstone Formation underlies the Michigan Formation (Ref. 31; 42, p. 19). Permeable sandstones in the Marshall Formation compose the Marshall aquifer (Ref. 34, p. 12). The Coldwater confining unit of shale, siltstone, sandstone, limestone, and dolomite forms the base of the Marshall aquifer (Refs. 34, p. 16; 42, pp. 18, 19).

### **Regional Aquifers/Stratum:**

Aquifer/Stratum 1 (uppermost) – Glacial Drift Aquifer (Quaternary Period): The glacial drift deposits in Jackson County are generally 100 feet thick or less in the Jackson area and include outwash, moraines, and till plains (Ref. 32, p. 42). In Jackson County, there is an abundance of outwash interspersed throughout the county (Ref. 32, p. 42). Glacial outwash is generally very permeable and composed of sand and gravel (Ref. 32, p. 42). Moraines and till plains are composed of till, a mixture of clay, silt, sand, and gravel, which often has low to moderate permeability (Ref. 32, p. 42). The till in Jackson County is medium to coarse grained and generally very permeable (Refs. 28; 32, p. 42). Glacial wells may supply water that is hard to very hard (Ref. 32, p. 42). Numerous domestic wells draw water solely from the Glacial Drift within 4 miles of the Michner Plating facility, which constitutes evidence that it is used as an aquifer (Ref. 38, pp. 3-33). One background temporary well and eight downgradient observed release wells (two temporary and six permanent) have been installed at and near the Michner Plating facility to evaluate groundwater quality in the Glacial Drift aquifer beneath the site (Refs. 5, pp. 55, 115, 117, 119; 6, pp. 50, 75; 21). These wells were installed as part of the 2018 SI and the 2019 ESI into the uppermost Glacial Drift aquifer (Refs. 5, p. 21; 6, p. 20; 21). The depth and geology of the SI and ESI wells is consistent with the Glacial Drift aquifer (Refs. 5, pp. 50-55; 6, pp. 41-50; 21; 29).

Aquifer/Stratum 2 – Saginaw Aquifer (Pennsylvanian Period): The Saginaw aquifer is utilized in the northern portion of Jackson County (Ref. 33, pp. 16, 22, 23). The Saginaw Formation is described in three well logs near the Michner Plating facility and geologic references indicate that the Saginaw aquifer subcrops north of the city (Refs., 32, p. 43; 33, pp. 23, 28; 35, pp. 10, 11, 12; 43, p. 4; 36, p. 5; 43, p. 4). Consequently, the Saginaw aquifer is not beneath the site and is only described as an aquifer/stratum here as it possibly exists within 4 miles north of the site (Refs. 32, p. 43; 33, p. 28; 35, pp. 10, 11, 12; 43, p. 4).

Aquifer/Stratum 3 – Parma-Bayport Aquifer (Pennsylvanian and Mississippian Periods): The Parma Sandstone and Bayport Limestone appear to interfinger throughout the Michigan basin (Refs. 32, p. 36; 35, p. 9). These units are hydraulically connected, and, together, they form the Parma-Bayport aquifer (Refs. 32, p. 43; 33, pp. 22, 26; 35, p. 9). The Parma-Bayport aquifer subcrops in the northern portion of the county north of the city with the Saginaw Formation, is likely less than 50 feet thick, and may be saline (Refs. 32, p. 36; 33, p. 26, 27). The Parma-Bayport aquifer is not continuous beneath the site (Ref. 29).

Aquifer/Stratum 4 – Michigan Formation Confining Unit (Mississippian Period): The Michigan Formation confining unit is described as being present under much of the Michigan basin, but it decreases in thickness to the south and east, and the Michner Plating facility is near the southernmost extent of the formation where it subcrops into the glacial drift (Refs. 31; 33, p. 27; 34, pp. 9, 10, 11).

Aquifer/Stratum 5 – Marshall Sandstone Aquifer (Mississippian Period): The Marshall aquifer exists in permeable sandstones beneath the Michigan Formation (Ref. 32, p. 36). The Marshall aquifer generally supplies water to the southern portion of Jackson County, which is where all City of Jackson and Summit Township municipal wells are located (see HRS documentation record Figure 3) (Refs. 32, p. 36; 42, p. 19). The Marshall aquifer is most productive where it subcrops in a band across the middle of the county (Ref. 42, p. 19). The aquifer hydraulic conductivity in these most productive portions where the Marshall aquifer subcrops were measured by the City of Jackson at  $8.8 \times 10^{-2}$  centimeters per second (Ref. 42, p. 20). The Marshall aquifer yields fresh water in the majority of Jackson County except in the north-central portion of the county where it yields saline water (Ref. 32, p. 36). Large groundwater withdrawals are possible in Jackson County because the Marshall aquifer is highly fractured (Ref. 33, p. 39). Geologic mapping indicates that an east-west trending band of the Marshall Formation subcrops in the middle of Jackson County, which is where the Marshall aquifer exhibits high water productivity (Ref. 42, p. 20). The City of Jackson municipal water supply wells draw exclusively from this area of the Marshall aquifer (Ref. 42, pp. 18, 19). Summit Township municipal wells draw from the Marshall aquifer based on the fact that they are bedrock wells and their depth correspond to the Marshall aquifer formation depth in other nearby bedrock wells screened in the Marshall aquifer (Refs. 30; 32, p. 43; 50, p. 1).

#### **Site Geology/Hydrogeology:**

Four deep wells with accompanying well logs were identified within a half mile of the Michner Plating facility (Ref. 29, pp. 1-5). These wells and well logs were used to evaluate the geology near the Michner Plating facility (distance from the Michner Plating facility is provided in parentheses):

- Eastern Michigan Power Co. Well (under 0.25 mile south of Michner)
- State Prison Well (approximately 0.25 mile north of Michner)
- Michner Plating Well (0 feet from the Michner Plating facility – located on property)
- R and J Plating Well (under 0.25 mile south of Michner)

For these four wells closest to the facility, descriptions are provided in well logs that indicate the presence of certain formations and their depths (depths are shown below in parentheses) (Ref. 29, pp. 1-5). Based on these four well logs, the range of depths of three formations was estimated beneath the Michner Plating facility (Ref. 29, pp. 1-5). The following are the likely formations beneath the Michner Plating facility based on interpretation of the information provided in the well logs and from descriptions of local geology (Refs. 29, pp. 1-5; 31, p. 1):

- Glacial Drift (0-10 feet based on Michner Plating Well)
- Saginaw Formation (10-170 feet based on Michner Plating Well)
- Parma Formation (not likely present continuously)
- Michigan Formation (not likely present continuously)
- Marshall Formation (170-350 feet based on Michner Plating Well)

#### Aquifer Discontinuities/Distance from Source

Although not all aquifers exist throughout the 4-mile target distance limit, there is no evidence of aquifer discontinuities within 4 miles of the site.

#### Aquifer Interconnections/Distance from Source

Several forms of evidence are provided below that document aquifer interconnection between the shallowest aquifer (Aquifer/Stratum 1 – Glacial Drift) and the deepest aquifer (Aquifer/Stratum 5 – Marshall).

Firstly, two of the four aquifers are not continuous within 2 miles of the Michner site:

- The Saginaw aquifer (Aquifer/Stratum 2) and the Parma-Bayport aquifer (Aquifer/Stratum 3) increasingly slope upward and pinch out toward the southern end of the Michigan basin (near the City of Jackson) and subcrop into the glacial drift within 2 miles of sources at the Michner Plating site (Refs. 29, pp. 2-5; 33, pp. 14, 16, 22, 23, 24, 26, 27; 35, pp. 10-18; 37). In addition, the Mansion Street Well #1 (a Jackson City municipal well located 1.88 miles south of Michner Plating) well log shows that the Saginaw aquifer and Parma-Bayport aquifer formations are absent 1.88 miles of the Michner Plating site (Refs. 30, pp. 1-3; 37; 39, p. 2). Therefore, the Saginaw aquifer and the Parma-Bayport aquifer are considered absent within 2 miles of the Michner Plating site (Refs. 29, pp. 2-5; 33, pp. 14, 16, 22, 23, 24, 26, 27; 35, pp. 10-18; 37).

Secondly, the Michigan Formation confining unit is absent within 2 miles of the Michner Plating site based on the following evidence:

- The Mansion Street Well #1 (a Jackson City municipal well located 1.88 miles south of Michner Plating) well log shows that the Michigan formation is absent 1.88 miles of the Michner Plating site (Refs. 30, pp. 1-3; 38; 39, p. 2).
- Based on two of the four well logs near the Michner Plating facility, the Michigan Formation is discontinuous beneath the Michner Plating facility (Ref. 29, pp. 1-2). This is consistent with regional geology descriptions that refer to the pinching out of the Michigan Formation in this area of the Michigan basin (Refs. 29, pp. 2-5; 33, pp. 14, 16, 22, 23, 24, 26, 27; 35, pp. 10-18).
- Water quality in the Marshall aquifer is suitable for most uses in subcrop areas, where the unit is in direct hydraulic connection with the glacial drift but becomes saline where overlain by the Saginaw and Parma-Bayport formations to the north (Ref. 34, p. 19). The Mansion Street Wellfield which is comprised of 13 wells screened in the Marshall aquifer has low salinity as evidenced by its use as a municipal water source (Refs. 34, pp. 15-19; 39).

Thirdly, evidence exists of anthropogenic contamination in groundwater collected from a Marshall sandstone aquifer-screened well located 1.88 miles of the Michner site:

- In 1982, the Michigan Department of Public Health tested the City of Jackson municipal wells as part of a state-wide municipal water testing program. The testing detected low levels of cis-1,2-dichloroethylene in five of the municipal wells, including City of Jackson Mansion Street Well #1 (Site ID 38000018) (Ref. 41, pp. 11, 16). City of Jackson Mansion Street Well #1 is located 1.88 miles southeast of the Michner site (Refs. 30, pp. 1-3; 39, p. 2) (see Figure 3 of this HRS documentation record). Levels of this compound in the wells was below the health risk-based criteria but above the detection limit (Ref. 41, p. 11). In 1986, the City of Jackson contracted with a consulting firm to perform a well head inspection of the municipal wells to investigate the possibility of physical defects in the wells allowing contaminants into the water (Ref. 41, p. 11). The consulting firm found this not to be the case, indicating that the contamination is coming from the aquifer where the well is screened (Ref. 41, p. 11). This well is screened in the Marshall aquifer (Ref. 30, pp. 1-3). Cis-1,2-dichloroethylene was found in this well at levels ranging from non-detect to 2 micrograms per liter (ug/l) (Ref. 41, p. 11).

**SUMMARY OF AQUIFERS BEING EVALUATED**

<b>Table 8</b>				
<b>Aquifer No.</b>	<b>Aquifer Name</b>	<b>Is Aquifer Interconnected with Upper Aquifer within 2 Miles? (Y/N/NA)</b>	<b>Is Aquifer Continuous within 4-Mile TDL? (Y/N)</b>	<b>Is Aquifer Karst? (Y/N)</b>
1	Glacial Drift	NA	Yes	No
2	Saginaw	Yes	No	No
3	Parma-Bayport	Yes	No	No
4	Marshall	Yes	Yes	No

Notes:

NA Not applicable

TDL Target Distance Limit

The four aquifers within 4 miles of the site are all interconnected or absent within 2 miles of the Michner Plating site. Therefore, they are evaluated as one hydrogeologic unit for HRS scoring purposes.

### 3.1 LIKELIHOOD OF RELEASE

#### 3.1.1 OBSERVED RELEASE

An observed release by chemical analysis is established by showing that the hazardous substance in release samples is significantly greater in concentration than in the background samples and by documenting that at least part of the significant increase is attributable to a release from the site being evaluated. The significant increase can be documented in one of two ways for HRS purposes. If the background concentration is not detected (or is less than the detection limit), an observed release is established when the sample measurement equals or exceeds the appropriate quantitation or detection limit. If the background sample concentration equals or exceeds the quantitation or detection limit, an observed release is established when the sample measurement is three times or more above the background concentration and above the appropriate quantitation or detection limit (Ref. 1, Table 2-3).

Aquifer Being Evaluated: Aquifers 1-4 (Marshall Aquifer and Interconnected Overlying Aquifers)

##### Chemical Analysis

An observed release is established to the glacial drift (Aquifer 1) portion of the interconnected aquifer system (Aquifers 1-4) beneath the Michner Plating facility based on temporary and permanent monitoring wells at the facility. The groundwater sampling that documents this observed release by chemical analysis was performed during the MDEQ SI (Ref. 5) and MDEQ ESI (Ref. 6).

For the SI, MDEQ installed four temporary groundwater monitoring wells in October 2016 (Ref. 5, pp. 21, 150). The wells and samples are identified as TMW-01 (background well/sample), TMW-03, TMW-04, and TMW-05 (Ref. 5, pp. 21, 44, 54). The methods for well installation, development, and sampling are described in the SI report (Ref. 5, pp. 21, 22). Well details are provided in Table 3 of the SI report, and locations are shown on Figure 6 (Ref. 5, pp. 44, 54). Temporary monitoring wells were installed at soil borings (Ref. 5, pp. 150, 151). The groundwater samples were analyzed using the CLP SOW ISM02.3 procedures for inorganics and low level volatile target analytes; with mercury analysis performed using a Cold Vapor AA Technique, cyanide analysis performed using the MIDI distillation procedure, and the remaining inorganic analyses performed using an Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS) procedure (Refs. 15, p. 2; 44, p. 2).

For the ESI, MDEQ installed six groundwater monitoring wells in August 2018 (Ref. 6, pp. 20, 112-115). The wells and samples are identified as MW-9SF, MW-10SF, MW-11SF, MW-13SF, MW-14SF (also known as MW-2-18), and MW-15SF (Ref. 6, pp. 48, 49). The methods for well installation, development, and sampling are described in the ESI report (Ref. 6, pp. 20, 21). Well details are provided in Table 2 of the ESI report, and locations are shown on Figure 6 (Ref. 6, pp. 38, 48, 49). Despite numerous attempts, a permanent background monitoring well was not installed during the ESI sampling event (Ref. 6, p. 18). Therefore, results of samples collected during the SI for background well TMW-01 are used as the background level for both SI and ESI groundwater sampling in this HRS documentation record (Ref. 6, p. 18). Groundwater samples were analyzed using the CLP SOW ISM02.4 analysis procedures for low level volatile and inorganic target analytes (Refs. 7, p. 2; 24, p. 2). Mercury analysis was performed using a Cold Vapor AA technique; cyanide analysis was performed using the MIDI distillation procedure; and the remaining inorganic analyses were performed using ICP-MS procedure (Ref. 7, p. 2).

Groundwater in the shallow glacial drift aquifer beneath the site generally flows to the west toward the Grand River (Ref. 5, p. 22). Groundwater elevations directly beneath buildings on the facility are likely higher because

of roof and floor drains discharging to groundwater beneath the buildings following rain events (Ref. 5, p. 22). There are no other possible sources of contamination between the background well (TMW-01) and the Michner Plating facility, which is directly west of TMW-01 across Mechanics Street (Ref. 5, pp. 16, 45). Descriptions of background and release concentrations are provided in the tables below as evidence of this observed release by chemical analysis.

Based on the information provided above, the background and release groundwater samples are considered similar for comparison purpose because: (1) they had similar sample collection procedures; (2) they were collected from similar sample depths; (3) they were all collected from the bottom of the Glacial Drift aquifer (at bedrock formation refusal); and (4) they were all analyzed using the same or similar analytical methods.

- Background Concentrations:

<b>Table 9</b>			
<b>Sample ID</b>	<b>Screened Interval in Feet Above Mean Sea Level (amsl)</b>	<b>Date</b>	<b>References</b>
TMW-01	916.12 – 921.12*	10/25/2016	5, p. 115

Notes:

\* The screen interval for the background temporary monitoring well (TMW-01) in the MDEQ SI was referenced to an arbitrary 100-foot elevation for the top of the casing (Ref. 5, pp. 21, 22). In the MDEQ ESI, the top of casing elevations for all wells were surveyed to the nearest 0.01 foot after the installation of the new permanent monitoring wells (Ref. 6, p. 21). To convert the arbitrary elevations in the SI into actual feet amsl, the two ESI and SI wells closest to one another in a flat area (MW-15SF and TMW-04) were considered to have the same top of casing elevation (Refs. 5, pp. 16, 44, 55, 150; 6, pp. 21, 38, 50, 94). Using the amsl benchmarked ESI well top of casing elevation, the SI well top of casing elevations and screening intervals were converted to comparable amsl elevations (Refs. 5, pp. 16, 44, 55, 150; 6, p. 21, 38, 50, 94; 21).

ESI Expanded Site Inspection

MDEQ Michigan Department of Environmental Quality

SI Site Inspection

<b>Sample ID</b>	<b>Lab ID</b>	<b>Hazardous Substance</b>	<b>Concentration</b>	<b>SQL/ CRQL</b>	<b>References</b>
<b>TMW-01</b>	<b>ME7ED5</b>	<b>Inorganics</b>	<b>µg/L</b>	<b>µg/L</b>	5, pp. 143-152; 15, pp. 1-6, 61, 62
		Arsenic	8.4	1.0	15, pp. 10, 55
		Cadmium	0.5547 <sup>a</sup> (0.43J)	1.0	15, pp. 6, 10, 55
		Chromium	3.8J+	2.0	15, pp. 6, 10, 55
		Copper	5.6	2.0	15, pp. 10, 55
		Cyanide	6.256 <sup>a</sup> (4.6J)	10.0	15, pp. 6, 9, 59
		Nickel	23.4	1.0	15, pp. 10, 55
Zinc	176J+	2.0	15, pp. 6, 10, 55		
<b>TMW-01</b>	<b>E7ED5</b>	<b>Volatiles</b>	<b>µg/L</b>	<b>µg/L</b>	5, pp. 143-152; 44, pp. 1-9, 151, 152
		1,1-Dichloroethylene	5.0U	5.0	44, pp. 9, 18, 124
		cis-1,2-Dichloroethylene	35	5.0	44, pp. 9, 18, 124
		Trans-1,2-Dichloroethylene	2.0J*	5.0	44, pp. 9, 18, 124
		Vinyl chloride	1.4J*	5.0	44, pp. 9, 18, 124
		1,1,1-Trichloroethane	5.0U	5.0	44, pp. 9, 18, 124
		1,1-Dichloroethane	5.0U	5.0	44, pp. 9, 18, 124
		Tetrachloroethylene	5.0U	5.0	44, pp. 9, 19, 124
		Trichloroethylene	2.1J*	5.0	44, pp. 9, 18, 124

Notes:

\* The concentration reported is qualified with a “J” because it is greater than or equal to the method detection limit and below the CRQL. These data have no bias and are usable as is for establishing a background concentration (Ref. 1, Table 2-3).

<sup>a</sup> The “J” qualified background concentrations have unknown bias; therefore, the reported concentrations have been adjusted according to EPA fact sheet “*Using Qualified Data to Document an Observed Release and Observed Contamination*” (Ref. 22, p. 18). The laboratory-reported concentrations and qualifiers are shown in parentheses.

µg/L Microgram per liter

CRQL Contract required quantitation limit. The EPA Contract Lab Program (CLP) sample adjusted CRQL is equivalent to the CRQL as defined by the HRS, Section 1.1., Definitions. (Refs. 1, Section 1.1; 15, pp. 2, 55-60; 44, pp. 2, 124-150).

EPA U.S. Environmental Protection Agency

J+ The “J+” qualified background concentrations for chromium and zinc are biased high and, therefore, need not be adjusted according to the EPA fact sheet “*Using Qualified Data to Document an Observed Release and Observed Contamination*” (Ref. 22, pp. 8, 18).

SQL Sample quantitation limit, also known as the sample-adjusted CRQL, is equivalent to the CRQL as defined by the HRS, Section 1.1., Definitions. (Refs. 1, Section 1.1; 15, pp. 2, 55-60; 44, pp. 2, 124-150).

- Contaminated Samples:

Contaminated groundwater samples were collected from temporary monitoring wells TMW-04 and TMW-05 as part of the SI and from monitoring wells MW-9SF, MW-10SF, MW-11SF, MW-13SF, MW-14SF (also known as MW-2-18), and MW-15SF as part of the ESI (Refs. 5, p. 21; 6, pp. 48, 49). These samples were all collected from locations hydraulically downgradient of sources at the site and outside the influence from other sources not associated with the site (Refs. 5, pp. 39, 40, 45; 6, pp. 36, 38).

Sample ID	Screened Interval in Feet Above Mean Sea Level (amsl)	Date	References
TMW-04	922.021* - 917.021	10/25/2016	5, pp. 55, 117; 21
TMW-05	918.891* - 913.891	10/25/2016	5, pp. 55, 119; 21
MW-9SF	921.137 – 916.137	8/23/2018	6, pp. 50, 75; 21
MW-10SF	922.002 – 917.002	8/23/2018	6, pp. 50, 76; 21
MW-11SF-R**	916.632 – 911.632	8/29/2018	6, pp. 50, 77; 21
MW-13SF	914.592 – 909.592	8/24/2018	6, pp. 50, 79; 21
MW-14SF	919.284 – 914.284	8/23/2018	6, pp. 50, 81; 21
MW-15SF	918.888 – 913.888	8/24/2018	6, pp. 50, 83; 21

Notes:

- \* The screen intervals for the TMW wells in the MDEQ SI were referenced to an arbitrary 100-foot elevation and not to actual elevation (Ref. 5, pp. 21, 22). See note under background wells table for details on the conversion of screen intervals to comparable elevations in feet amsl.
- \*\* Sample ID MW-11SF-R is a second (“re-sampled”) sample collected from MW-11SF for VOAs and SVOAs because of UPS shipping issues with the original MW-11SF groundwater sample (Ref. 6, pp. 77, 107). Results from the original sample are usable for inorganics because no holding times were exceeded (Ref. 6, pp. 77).

MDEQ Michigan Department of Environmental Quality

SI Site Inspection

SVOA Semi-Volatile Organic Analytes

VOA Volatile Organic Analytes

Sample ID	Lab ID	Hazardous Substance	Concentration	CRQL	References
TMW-04	ME7ED9	<b>Inorganics</b>	<b>µg/L</b>	<b>µg/L</b>	5, pp. 143-152; 15, pp. 1-6, 61, 62
		Arsenic	81.4	2.0	15, pp. 23, 55
		Cadmium	4.1	2.0	15, pp. 23, 56
		Chromium	106	4.0	15, pp. 23, 56
		Copper	44.2	4.0	15, pp. 23, 56
		Nickel	597	2.0	15, pp. 23, 56
		Cyanide	110	10.0	15, pp. 22, 59

<b>Table 12</b>					
<b>Sample ID</b>	<b>Lab ID</b>	<b>Hazardous Substance</b>	<b>Concentration</b>	<b>CRQL</b>	<b>References</b>
<b>TMW-04</b>	<b>E7ED9</b>	<b>Volatiles</b>	<b>µg/L</b>	<b>µg/L</b>	5, pp. 143-152; 44, pp. 1-9, 151, 152
		cis-1,2-Dichloroethylene	560	50	44, pp. 44, 125
		Vinyl Chloride	1,800	250	44, pp. 44, 125
<b>TMW-05</b>	<b>E7EE0</b>	<b>Volatiles</b>	<b>µg/L</b>	<b>µg/L</b>	5, pp. 143-152; 44, pp. 1-9, 151, 152
		Vinyl chloride	35	5.0	44, pp. 53, 126
<b>MW-9SF/ MW9SFD*</b>	<b>E0AA5/ E0AA6</b>	<b>Volatiles</b>	<b>µg/L</b>	<b>µg/L</b>	6, pp. 87-115; 24, pp. 1-14, 222-230
		Trichloroethylene	126.5 <sup>a</sup> (210J)	25	24, pp. 3, 4, 67, 182
		Tetrachloroethylene	14 <sup>a</sup> (140J)	5.0	24, pp. 3, 4, 67, 183
<b>MW-9SF/ MW9SFD*</b>	<b>ME0AA5/ME0A A6</b>	<b>Inorganics</b>	<b>µg/L</b>	<b>µg/L</b>	6, pp. 87-115; 7, pp. 1-7, 65-67
		Cadmium	22.8	1.0	7, pp. 28, 55
		Chromium	27.8	2.0	7, pp. 28, 56
		Nickel	452	1.0	7, pp. 31, 56
		Zinc	1,120	2.0	7, pp. 28, 56
<b>MW-10SF</b>	<b>E0AA7</b>	<b>Volatiles</b>	<b>µg/L</b>	<b>µg/L</b>	6, pp. 87-115; 24, pp. 1-14, 222-230
		1,1,1-Trichloroethane	5.4 <sup>a</sup> (54J)	5.0	24, pp. 3, 4, 73, 183
		Trichloroethylene	271.0 <sup>a</sup> (450J)	50	24, pp. 3, 4, 73, 183
		Tetrachloroethylene	7.2 <sup>a</sup> (72J)	5.0	24, pp. 3, 4, 73, 183
<b>MW-10SF</b>	<b>ME0AA7</b>	<b>Inorganics</b>	<b>µg/L</b>	<b>µg/L</b>	6, pp. 87-115; 7, pp. 1-7, 65-67
		Chromium	11.5	2.0	7, pp. 34, 56

Table 12					
Sample ID	Lab ID	Hazardous Substance	Concentration	CRQL	References
MW-11SF-R	E0AB8	<b>Volatiles</b>	<b>µg/L</b>	<b>µg/L</b>	6, pp. 87-115; 24, pp. 1-14, 222-230
		1,1-Dichloroethylene	9.0	5.0	24, pp. 111, 186
		trans-1,2-Dichloroethylene	21	5.0	24, pp. 111, 186
		cis-1,2-Dichloroethylene	2,500	250	24, pp. 111, 186
		1,1-Dichloroethane	9.3	5.0	24, pp. 111, 186
		Trichloroethylene	1,600	250	24, pp. 111, 186
		Tetrachloroethylene	780	250	24, pp. 111, 186
		Vinyl chloride	32	5.0	24, pp. 111, 186
MW-13SF	ME0AA4	<b>Inorganics</b>	<b>µg/L</b>	<b>µg/L</b>	6, pp. 87-115; 7, pp. 1-7, 65-67
		Chromium	29.0	2.0	7, pp. 17, 55
		Nickel	129	1.0	7, pp. 17, 55
MW-14SF	E0AA9	<b>Volatiles</b>	<b>µg/L</b>	<b>µg/L</b>	6, pp. 87-115; 24, pp. 1-14, 222-230
		1,1,1-Trichloroethane	8.9 <sup>a</sup> (89J)	5.0	24, pp. 3, 4, 79, 184
		Trichloroethylene	289.1 <sup>a</sup> (480J)	50	24, pp. 3, 4, 79, 184
		Vinyl chloride	51.0 <sup>a</sup> (510J)	50	24, pp. 3, 4, 79, 184
MW-14SF	ME0AA9	<b>Inorganics</b>	<b>µg/L</b>	<b>µg/L</b>	6, pp. 87-115; 7, pp. 1-7, 65-67
		Cyanide	20.6	10.0	7, pp. 35, 58
		Cadmium	24.2	1.0	7, pp. 37, 56
		Nickel	13,100	20.0	7, pp. 37, 57
MW-15SF	E0AB0	<b>Volatiles</b>	<b>µg/L</b>	<b>µg/L</b>	6, pp. 87-115; 24, pp. 1-14, 222-230
		Vinyl chloride	83.0 <sup>a</sup> (830J)	50	24, pp. 3, 4, 85, 184

Notes:

- \* Samples MW-9SF and MW-9SFD are duplicate samples. The reported concentration is the lowest reported concentration from the two samples.
  - <sup>a</sup> The “J” qualified concentrations have unknown bias and, therefore, the reported concentrations have been adjusted according to EPA fact sheet “*Using Qualified Data to Document an Observed Release and Observed Contamination*” (Ref. 22, p. 18). The laboratory-reported concentrations and qualifiers are shown in parentheses.
- µg/L Microgram per liter

CRQL Contract required quantitation limit. The EPA Contract Lab Program (CLP) sample adjusted CRQL is equivalent to the CRQL as defined by the HRS, Section 1.1, Definitions. (Refs. 1, Section 1.1; 7, pp. 2, 54-58; 15, pp. 2, 55-60; 24, pp. 180-221; 44, pp. 2, 124-150).

EPA U.S. Environmental Protection Agency

J- The "J-" qualified release concentrations are biased low and, therefore, need not be adjusted according to the EPA fact sheet "*Using Qualified Data to Document an Observed Release and Observed Contamination*" (Ref. 22, pp. 8, 18).

### Attribution

Michner conducted plating operations at the facility from 1938 to 2007 (Ref. 17, pp. 1, 2). Michner was a supplier for the automotive industry, providing machine fabricating, rack design, and machine maintenance (Ref. 20, pp. 1, 2). Processes included Dacromet coating, nickel chrome plating, zinc plating, and powder coating (Refs. 10, p. 8; 20, p. 2). As indicated in the Facility History section, Dacromet is a proprietary coating system which involve the use of zinc, aluminum and chromium (Ref. 10, p. 8). Floor drains, parking areas, and roof drains also drained to a groundwater discharge line or directly to the Grand River. EPA ERB staff were informed of two additional alleged drum burial locations beneath the building during emergency removal efforts in early 2016 (Ref. 6, p. 8). Pollution prevention plans for the Michner Plating facility indicate that an unapproved, faulty overflow system used to discharge to the groundwater and flow to the river (Ref. 6, p. 14). This discharge area has not been located, but the geophysical survey did reveal anomalies that could be indicative of the discharge to the groundwater (Ref. 6, p. 14). These subsurface waste disposal methods would result in subsurface contaminant discharges near the top of the glacial drift aquifer.

1,1,1-Trichloroethane, cis-1,2-dichloroethylene, trichloroethylene, and tetrachloroethylene identified in the observed release by chemical analysis are also found in contaminated surface or subsurface soils in Source 1 (see Section 2.2.2 of this HRS documentation record). In addition, 1,1-dichloroethane, 1,1-dichloroethylene, trans-1,2-dichloroethylene, and vinyl chloride are daughter products of PCE and TCE through degradation processes, such as reductive dehalogenation (Ref. 45, pp. 38, 39). Inorganic contaminants include arsenic, cadmium, chromium, copper, cyanide, nickel, and zinc detected in downgradient groundwater at concentrations that meet the criteria for an observed release by chemical analysis are all associated with the metal plating processes used at the Michner Plating facility and are found in Source 1 (see Section 2.2.2 of this HRS documentation record) (Ref. 24, pp. 2, 3; 47, pp. 82, 86).

At the time of the EPA time-critical removal action in 2015, the facility contained 1,100 drums, vats, totes, and other containers (Ref. 17, p. 2). Labels and chemical analysis of wastes in these containers indicated the potential presence of cyanide, zinc cyanide, nickel chloride, chromic acid, hydrogen peroxide, sulfuric acid, ignitable wastes, reactive wastes (including water reactive chemicals), and other chemicals (Ref. 17, p. 2). Waste manifests from the time-critical removal action show disposal of hazardous wastes containing flammable liquids, corrosive liquids and solids, alkaline and neutral liquids and solids, cadmium, chromium, cyanide, sodium hydroxide, potassium hydroxide, potassium dichromate, and lead (Refs. 19; 20, pp. 53, 58,63, 64). While these wastes were removed from the facility, the time-critical removal action occurred after Michner Plating Company went bankrupt and vacated the property (Ref. 20, pp. 1, 2).

Analysis of waste flammable liquids removed from the facility during the time-critical removal action revealed trichloroethylene at 170,000,000 micrograms per kilogram dry-weight ( $\mu\text{g}/\text{kg-dry}$ ) and 1,200,000  $\mu\text{g}/\text{L}$ , xylenes (total) at 200,000,000  $\mu\text{g}/\text{kg-dry}$ , and 1,1,1-trichloroethane at 1,400,000  $\mu\text{g}/\text{kg-dry}$  (Ref. 47, pp. 16, 25, 26, 35).

Analysis of waste alkaline liquids removed from the facility during the time-critical removal action revealed arsenic at 3.8 milligrams per kilogram dry-weight (mg/kg-dry), cadmium at 12,000 mg/kg-dry, chromium at 11 mg/kg-dry, copper at 170 mg/kg-dry, nickel at 18 mg/kg-dry, and zinc at 3,000 mg/kg-dry (Ref. 47, p. 8).

Analysis of waste neutral solids removed from the facility during the time-critical removal action revealed arsenic at 23 mg/kg-dry, cadmium at 740 mg/kg-dry, chromium at 11,000 mg/kg-dry, copper at 1,100 mg/kg-dry, nickel at 13,000 mg/kg-dry, zinc at 14,000 mg/kg-dry, cis-1,2-DCE at 34 µg/kg-dry, TCE at 1,500 µg/kg-dry, PCE at 700 µg/kg-dry, and xylenes (total) at 44,000 µg/kg-dry (Ref. 47, pp. 82, 85).

Analysis of waste neutral liquids removed from the facility during the time-critical removal action revealed arsenic at 7.6 mg/L, chromium at 8,800 mg/L, cobalt at 1,200 mg/L, nickel at 24,000 mg/L, and zinc at 39 mg/L (Ref. 47, p. 87).

The Michner Plating facility is located in a mixed commercial and residential area in Jackson, Michigan, with a railroad line to the west between the facility and the Grand River, commercial businesses to the north and south, and residential and commercial areas to the east (Refs. 3; 5, pp. 4, 39). The depth of the glacial drift aquifer is between 2 and 50 feet near the Michner Plating facility (Refs. 5, pp. 53; 6, pp. 47, 96, 100; 29). The glacial drift aquifer is relatively thin immediately beneath the site, and groundwater is generally less than 6 feet bgs (Ref. 6, p. 50). Water table elevations indicate that groundwater in the glacial drift aquifer flows to the west toward the Grand River (Ref. 6, pp. 21, 50). There are no other possible sources of contamination between the background well (TMW-01) and the Michner Plating facility, which is directly west of TMW-01 across Mechanics Street (Ref. 5, pp. 16, 45). Other nearby plating facilities are located cross-gradient with respect to groundwater flow direction (Ref. 5, pp. 4, 22; 46). Background temporary monitoring well TMW-01 is located between these plating facilities and the Michner Plating facility (Ref. 46, p. 2).

**Hazardous Substances Released**

Arsenic	1,1-Dichloroethylene
Cadmium	cis-1,2-Dichloroethylene
Chromium	trans-1,2-Dichloroethylene
Copper	1,1-Dichloroethane
Cyanide	1,1,1-Trichloroethane
Nickel	Trichloroethylene
Zinc	Tetrachloroethylene
	Vinyl chloride

Ground Water Observed Release Factor Value: 550

## 3.2 WASTE CHARACTERISTICS

### 3.2.1 TOXICITY/MOBILITY

<b>Hazardous Substance</b>	<b>Source No. (and/or Observed Release)</b>	<b>Toxicity Factor Value</b>	<b>Mobility Factor Value</b>	<b>Does Haz. Substance Meet Observed Release by chemical analysis? (Y/N)</b>	<b>Toxicity/Mobility (Ref. 1, Table 3-9)</b>	<b>Ref.</b>
Arsenic	1, OR	10,000	1*	Y	10,000	2: p. 1
Cadmium	1, OR	10,000	1*	Y	10,000	2: p. 2
Chromium	1, OR	10,000	1*	Y	10,000	2: p. 3
Copper	1, OR	100	1*	Y	100	2: p. 5
Cyanide	1, OR	1,000	1*	Y	1,000	2: p. 6
Dichloroethane, 1,1-	OR	10	1*	Y	10	2: p. 7
Dichloroethylene, 1,1-	OR	10	1*	Y	10	2: p. 8
Dichloroethylene, cis-1,2-	1, OR	1,000	1*	Y	1000	2: p. 9
Dichloroethylene, trans-1,2-	OR	100	1*	Y	100	2: p. 10
Lead	1	10,000	0.01	N	100	2: p. 11
Manganese	1	10,000	0.01	N	100	2: p. 12
Mercury	1	10,000	0.01	N	100	2: p. 13
Nickel	1, OR	10,000	1*	Y	10,000	2: p. 14
Selenium	1	100	1	N	100	2: p. 15
Silver	1	100	1	N	100	2: p. 16
Tetrachloroethylene	1, OR	100	1*	Y	100	2: p. 17
Trichloroethane, 1,1,1-	1, OR	1	1*	Y	1	2: p. 18
Trichloroethylene	1, OR	1,000	1*	Y	1,000	2: p. 19
Vanadium	1	10,000	0.01	N	100	2: p. 20
Vinyl Chloride	OR	10,000	1*	Y	10,000	2: p. 21
Xylenes	1	100	0.01	N	1	2: p. 22
Zinc	1, OR	10	1*	Y	10	2: p. 23

Notes:

- \* Mobility factor value is a default of 1 because hazardous substance meets the criteria as an observed release by chemical analysis (Ref. 1, Section 3.2.1.2).

Toxicity/Mobility Factor Value: 10,000  
(Ref. 1, Table 3-9)

### 3.2.2 HAZARDOUS WASTE QUANTITY

<b>Table 14</b>			
<b>Source No.</b>	<b>Source Type</b>	<b>Source Hazardous Waste Quantity</b>	<b>Source Hazardous Constituent Quantity Complete?</b>
1	Contaminated Soil	>0	No

Sum of Values: >0.

A minimum hazardous waste quantity factor value of 10 was assigned according to HRS Section 2.4.2.2 because the hazardous constituent quantity is not determined, none of the targets are subject to Level I or Level II concentrations, and a time-critical removal action was performed at the site.

Hazardous Waste Quantity Factor Value: 10  
(Ref. 1, Table 2-6, Section 2.4.2.2)

### 3.2.3 WASTE CHARACTERISTICS FACTOR CATEGORY VALUE

Toxicity/Mobility Factor Value: 10,000  
Hazardous Waste Quantity Factor Value: 10

Waste Characteristics Factor Category Value: 18  
(Ref. 1, Table 2-7)

### 3.3 TARGETS

Two municipal drinking water supply systems use groundwater as a source of drinking water within 4 miles of the Michner Plating site (see Figure 3 of this documentation record) (Refs. 39; 50). These are municipal water supply systems for the City of Jackson and Summit Township (Refs. 39; 50).

The City of Jackson water supply system is a blended system and consists of 4 wells in the Sharp Park Well area and 13 wells near 740 East Mansion Street (Ref. 39, p. 1). No single well provides over 40 percent to the overall system, and there are no other sources of water for the system (Ref. 39, p. 1). The City of Jackson recently conducted a population study and determined that 44,414 people are served by the water supply system (Ref. 39, p. 2). A population served of 44,414 divided by 17 wells yields an estimated 2,612 people per well (Ref. 39, p. 2). All City of Jackson wells are within 4 miles of the Michner Plating site (see Figure 3, 4-Mile Radius Map) (Ref. 39, p. 2).

The Summit Township water supply system is a blended system and consists of 15 wells and no other sources of drinking water (Ref. 50, p. 1). Each well contributes approximately equally to the overall system (Ref. 50, p. 1). The system has 7,820 connections in Summit Township and also supplies 750 connections in Spring Arbor (Ref. 50, p. 1). According to the most recent U.S. Census data, the average number of people per household in Summit Township is 2.42 (Ref. 48, p. 1). Therefore, the total population served by the Summit Township water supply system is 20,739. A population served of 20,739 divided by 15 wells yields an estimated 1,382 people per well (Ref. 50, p. 1). Nine of the 15 Summit Township wells are located within 4 miles of the Michner Plating site (see Figure 3, 4-Mile Radius Map) (Ref. 50, p. 1).

#### 3.3.1 NEAREST WELL

Well ID: City of Jackson Mansion Street Well #2 (Ref. 39, p. 2).

Level of Contamination (I, II, or potential): Potential

If potential contamination, distance from source in miles: 1.8 miles (Ref. 39, p. 2).

Nearest Well Factor Value: 5  
(Ref. 1, Table 3-11)

#### 3.3.2 POPULATION

##### 3.3.2.1 Level of Contamination

No drinking water wells are known to be contaminated as a result of the Michner Plating facility.

##### 3.3.2.2 Level I Concentrations

No drinking water wells are known to be contaminated as a result of the Michner Plating facility.

##### 3.3.2.3 Level II Concentrations

No drinking water wells are known to be contaminated as a result of the Michner Plating facility.

### 3.3.2.4 Potential Contamination

#### Potential Population Targets

The City of Jackson has 11 wells located between 1 and 2 miles from the Michner Plating site (Ref. 39, p. 2). The remaining 6 City of Jackson wells are located between 2 and 3 miles from the Michner Plating site (Ref. 39, p. 2). Summit Township has 9 wells located between 3 and 4 miles from the Michner Plating site (Ref. 50, p. 1). All other Summit Township wells are located beyond 4 miles from the Michner Plating site (Ref. 50, p. 1). Figure 3 of this HRS documentation record shows the locations of the City of Jackson and Summit Township wells that are located within 4 miles of the Michner Plating site.

<b>Table 15</b>			
<b>Distance Category</b>	<b>Population</b>	<b>References</b>	<b>Distance-Weighted Population Value (Ref. 1, Table 3-12)</b>
0 to 1/4 mile	0		0
>1/4 to 1/2 mile	0		0
>1/2 to 1 mile	0		0
>1 to 2 miles	City of Jackson 11 wells: $2,612 \times 11 = 28,732$	39; 50	2,939
>2 to 3 miles	City of Jackson: 6 wells: $2,612 \times 6 = 15,672$	39; 50	2,122
>3 to 4 miles	Summit Township: 9 wells: $1,382 \times 9 = 12,438$	39; 50	1,306

Sum of Distance-Weighted Population Values: 6,367  
 Sum of Distance-Weighted Population Values/10: 636.7

Potential Contamination Factor Value: 637

### 3.3.3 RESOURCES

<b>Table 16</b>			
<b>Well ID</b>	<b>Aquifer No.</b>	<b>Resource Use</b>	<b>References</b>
Sharp Park Wells 1 to 4	Aquifer 4: Marshall Aquifer	Designated water recreation areas – city parks, including water parks	39, p. 1
Mansion Street Wells 1 to 12	Aquifer 4: Marshall Aquifer	Designated water recreation areas – city parks, including water parks	39, p. 1

Resources Factor Value: 5

### 3.3.4 WELLHEAD PROTECTION AREA

A wellhead protection area designated according to Section 1428 of the Safe Drinking Water Act, as amended, lies within 4 miles of the Michner Plating site (Ref. 42, p. 46). The City of Jackson and Summit Township municipal wells are located within the Wellhead Protection Area (Ref. 42, p. 46).

<b>Table 17</b>			
<b>Area</b>	<b>Use</b>	<b>References</b>	<b>Value</b>
South Jackson	Drinking and municipal uses.	42, p. 46	5

Wellhead Protection Area Factor Value: 5